Access Navigator

USER MANUAL

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PREFACE

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Compliance

USA

- UL 1950, 3rd Edition
- FCC Part 15, Class A
- FCC Part 68
- NEBS Level 3 for Type 2 and 4 equipment
  GR-1089-CORE
  GR-63-CORE

CANADA

- CSA C22.2 No. 950.95
- ICES-003, Class A
- CS-03

See Chapters 2, 3, and 4 for detailed compliance requirements on each product.

Notices

This manual contains important information and warnings that must be followed to ensure safe operation of the equipment.

DANGER! **A *DANGER* NOTICE INDICATES THE PRESENCE OF A HAZARD THAT CAN OR WILL CAUSE DEATH OR SEVERE PERSONAL INJURY IF THE HAZARD IS NOT AVOIDED.**

CAUTION! **A *CAUTION* NOTICE INDICATES THE POSSIBILITY OF INTERRUPTING NETWORK SERVICE IF THE HAZARD IS NOT AVOIDED.**

WARNING! **A *WARNING* NOTICE INDICATES THE POSSIBILITY OF EQUIPMENT DAMAGE IF THE HAZARD IS NOT AVOIDED.**

NOTE: A *Note* indicates information to help you understand how to perform a procedure or how the system work. Notes should be read before performing the required action.

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Electrostatic Discharge (ESD) Precautions

ESD can damage processors, circuit boards, and other electronic components. Always observe the following precautions before installing a system component.

1. Do not remove a component from its protective packaging until ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.
3. For more information, see *Static-Sensitive Equipment Handling Procedures* on page 3.

WARNING! **INTEGRATED CIRCUITS (ICS) ARE EXTREMELY SUSCEPTIBLE TO ELECTROSTATIC DISCHARGE. UNLESS YOU ARE A QUALIFIED SERVICE TECHNICIAN WHO USES TOOLS AND TECHNIQUES THAT CONFORM TO ACCEPTED INDUSTRY PRACTICES, DO NOT HANDLE ICS.**

The ESD warning label appears on packages and storage bags that contain static-sensitive products and components.

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Before returning any equipment to Carrier Access, first contact the distributor or dealer from which you purchased the product.

A Return Material Authorization (RMA) number is required for all equipment returned to Carrier Access. Call Carrier Access Customer Support at (800) 786-9929 or (303) 442-5455 for RMA number, repair/warranty information and shipping instructions. Be prepared to provide the following information:

- Carrier Access serial number(s) from the system chassis or circuit card(s)
- Name of distributor or dealer from which you purchased the product
- Description of defect

Ensure that returned items are packaged properly:

- Follow *Electrostatic Discharge (ESD) Precautions* on page v
- Enclose circuit cards in anti-static wrappers
- Cushion items to prevent damage during shipment
- If replacing parts, use same packaging to return old parts
- Ensure that shipping address is correct and clearly visible on outside of shipping container
- If returning equipment to Carrier Access Corporation, ensure that RMA number is clearly visible on outside of shipping container

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CHAPTER 1

Introduction

In this Chapter

- Overview ... 1-2
- Features and Benefits ... 1-3
- Access Navigator Configurations ... 1-3
- System Architecture ... 1-4
- Carrier Access Support Products ... 1-5
- Management ... 1-6

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Overview

The Access Navigator® Multiservice Digital Access (MDA) system combines the functionality of a miniature 1/0 digital crossconnect switch (DCS) with the call processing and concentration capabilities of a GR-303 digital loop carrier (DLC) system. Providing up to 32 DS1 ports (768 DS0s) in one small package, the Access Navigator fits easily into small collocation spaces and phone closets. Software configuration options include:

- DCS Service Manager
- GR-303 with Data Host
- GR-303 Host with P-Phone

The Access Navigator is a complete solution for managing 4 to 32 T1 access connections. In conjunction with Carrier Access' remotely managed Adit® 600 and Access Bank® families of T1 voice and data access products, the Access Navigator provides an end-to-end managed solution for deploying T1-based multi-line voice and data services to businesses, with up to 24 voice lines and data rates up to 1.536 Mbps.

Figure 1-1. Access Navigator

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Features and Benefits

The Access Navigator provides the ability to concentrate and groom a mix of voice and data information. The 1/0 crossconnect functionality of the DCS allows data channels from a variety of locations to be crossconnected and packed into dedicated T1s. The time slot interchange (TSI) functionality of the GR-303 system dynamically assigns voice traffic to the local digital switch. These two functions significantly reduce the number of switch ports and T1s required to backhaul both voice and data traffic.

DCS, GR-303, and P-Phone benefits include:

- Voice and data concentration
- Voice and data grooming
- GR-303 line concentration of 4:1 TDM ISDN BRI services
- GR-303 line concentration of Nortel P-Phone (EBS) services from CA's Adit® terminals
- Installation at central office or customer premises
- Remote Access Navigator management via Ethernet IP, Telnet, SNMP, Valet™ and NetworkValet™ EMS software
- Remote management of CA's Adit 600 and Access Bank® II terminals via T1 Facility Data Link
- Remote management of CA's Adit 600 terminals using IP commands via T1 DS0 channel

Access Navigator Configurations

With up to 32 DS1 interfaces, the Access Navigator has the capacity and flexibility to deploy a variety of voice and data services. Configurations include:

- Access Navigator / DCS Service Manager – crossconnects and grooms DS0s carrying voice and data for most efficient use of DS1s (see *Access Navigator / DCS Service Manager* on page 2-1).
- Access Navigator / GR-303 + Data Host – dynamically crossconnects and concentrates DS0 voice lines for most efficient switch usage, in addition to providing all DCS features (see *Access Navigator / GR-303 + Data Host* on page 3-1).
- Access Navigator / GR-303 Host with P-Phone – dynamically crossconnects and concentrates Nortel EBS (P-Phone) services from CA's Adit 600 terminals for most efficient switch usage, in addition to providing all GR-303 and DCS features (see *Access Navigator / GR-303 Host with P-Phone* on page 4-1).

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System Architecture

The Access Navigator is a distributed system in which the Access Navigator is the host terminal located at a co-location or customer premise. CA's Access Bank® and Adit® 600 products operate as remotely managed service units at the customer premises.

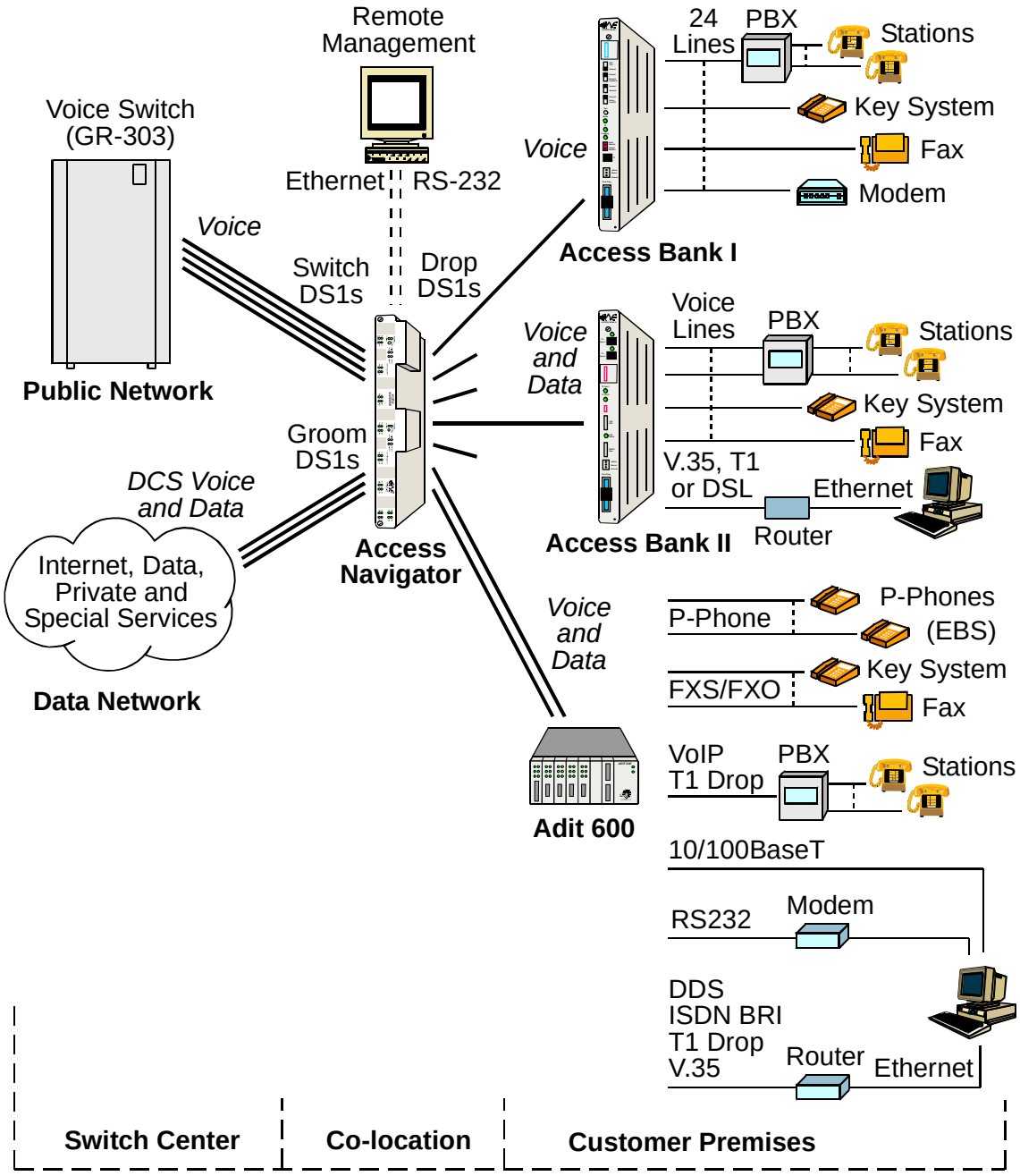

Figure 1-2. Access Navigator System Architecture

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Carrier Access Support Products

Access Banks

Access Bank® family of T1 CSU products (see Figure 1-2) includes:

- Access Bank I – up to 24 voice channels
- Access Bank II – up to 24 voice channels plus T1 and V.35 data interfaces
- Access Bank II / SNMP – up to 24 voice channels plus T1 and V.35 data, and Ethernet SNMP
- Access Bank II / SDSL – up to 24 voice channels plus SDSL and V.35 data interfaces

Adit 600

Adit® 600 family of Customer Service Terminals (see Figure 1-2) includes:

- Adit 600 TDM – 6 service card slots support up to 18 T1s per unit, up to 48 voice channels, or any combination of voice and data services

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Management

The Access Navigator includes RS-232 and Ethernet ports for local and remote management, provisioning, and testing (see Figure 1-3). Flow-through provisioning enables the Access Navigator to pre-provision, test and manage remote Access Bank II units to provide the required voice and data services. The Access Navigator also provides host support for provisioning and managing Adit 600 terminals.

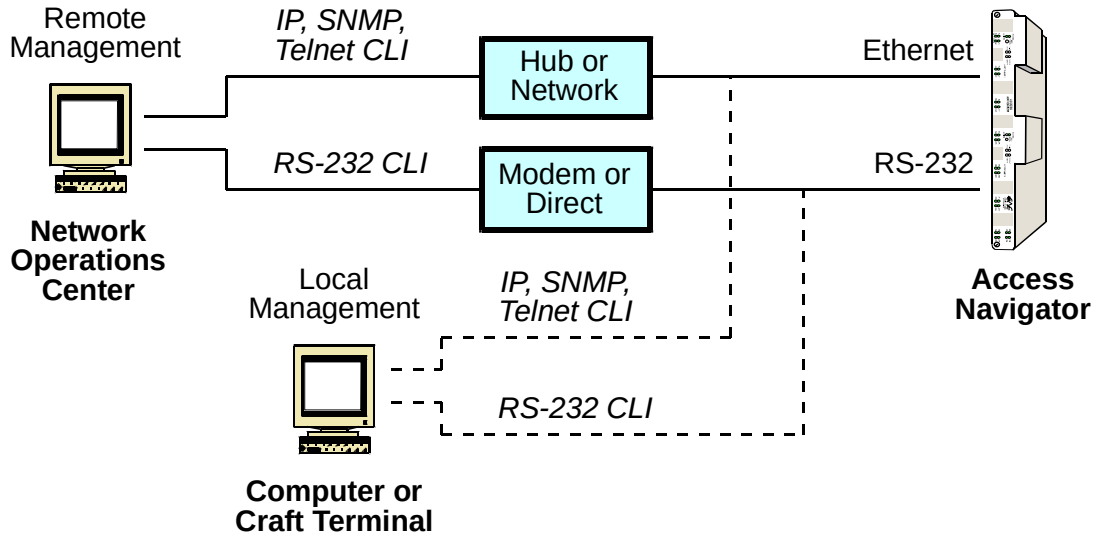

Figure 1-3. Access Navigator Management

Command Line Interface

The command line interface is a simple user interface that controls configuration and maintenance operations. There are two ways to use the command line interface:

- A VT-100 terminal (or a PC running terminal emulation software such as Hyper Terminal) connected to the 9-pin (DB9) RS-232 port. The port runs at 9600 baud, 8 data bits, 1 stop bit, no parity, and no flow control.
- A Telnet connection using the 10Base-T Ethernet port. To use Telnet, the user must first assign an IP address to the Access Navigator using the RS-232 interface.

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SNMP

The Access Navigator SNMP Agent is based on the SNMPv1 standard. It implements the following two industry standard specifications for the TCP/IP and DS1 interfaces, plus an Enterprise MIB developed for managing CA's Access Bank II products:

- RFC 1213 – Management Information Base for Network Management of TCP/IP-based internets: MIB-II
- RFC 1406 – Definitions of Managed Objects for the DS1 and E1 Interface Types

The Access Navigator supports:

- All mandatory objects defined in RFC 1213 for the TCP/IP network interface.
- The DS1 mandatory objects in RFC 1406 Near End Configuration Group, including the Near End Current, Interval, and Total objects. The Far End Object Group is optional and is not currently supported.

The CA Enterprise MIB provides management support for Access Navigator features not included in the standard MIB (RFC 1213). It also enables remote management of CA products connected via the T1 facility data link (FDL) to the Access Navigator (Figure 1-1). The CA Enterprise MIB supports:

- Access Navigator system configuration settings including SNMP
- Access Navigator interface management
- DS1 management features not supported by the standard MIB
- DS0 management
- Remote device management
- Remote crossconnect management
- Remote interface settings
- Remote DS1 settings
- Remote DS0 settings
- Remote cards and slots

The network manager can use any SNMP-compatible network management system such as SunConnect's SunNet Manager, HP OpenView, or Castle Rock's SNMPc to monitor and control the Access Navigator

The user connects to the SNMP agent through the 10Base-T Ethernet port. Before using the Ethernet port, the user must set the IP, mask, gateway, and NMS addresses using the RS-232 command line interface. See *Provision Access Navigator* on page 8-1 for instructions on how to configure these addresses.

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Valet and NetworkValet EMS Software

Valet™ and NetworkValet™ EMS are enhanced element management systems with simple graphical user interfaces. Valet is ideal for technicians deploying Access Navigators in carrier networks, while the full-featured NetworkValet EMS with alarms and performance monitoring is intended for Network Operations Centers (NOCs).

Valet and NetworkValet provide easy management of Carrier Access products including the Access Navigator and Adit 600. Valet and NetworkValet are cross-platform Java applications that run on either Microsoft Windows and Solaris based computer systems. Java Runtime Engine (JRE) software for Windows or Solaris is included with the Valet and NetworkValet installation programs.

Valet and NetworkValet send commands over the carrier's IP network to communicate with the SNMP agent in the Access Navigator. The Access Navigator includes a standard 10Base-T Ethernet port for connection to the hub or network interface, or laptop computer. The Access Navigator must have FLASH software version 1.7 or higher to support IP DS0 management of remote Adit 600 terminals.

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CHAPTER 2

Access Navigator / DCS Service Manager

In this Chapter

- Overview ... 2-2
- System Architecture ... 2-3
- Features and Benefits ... 2-4
- Configuration ... 2-6
- Applications ... 2-7
- Interfaces ... 2-7
- Specifications ... 2-7
- Compliance Requirements ... 2-10
- Ordering Information ... 2-12

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Overview

The Access Navigator® / DCS Service Manager is a complete service solution for managing 4 to 32 T1 access connections. The power of a remotely managed, 32-port, Digital Crossconnect System (DCS) is contained in only 1½ rack units. Integrated testing and optional common equipment redundancy ensure carrier-class service availability.

The Access Navigator / DCS Service Manager provides the functionality of a miniature 1/0 digital crossconnect switch (DCS). Providing up to 32 DS1 ports (768 DS0s) in one small package, the Access Navigator fits easily into small collocation spaces and phone closets.

The Access Navigator is a complete solution for managing 4 to 32 T1 access connections. In conjunction with Carrier Access' remotely managed Adit® 600 and Access Bank® families of T1 voice and data access products, the Access Navigator provides an end-to-end managed solution for deploying T1-based multi-line voice and data services to businesses, with up to 24 voice lines and data rates up to 1.536 Mbps.

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Figure 2-1. Access Navigator / DCS Service Manager

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System Architecture

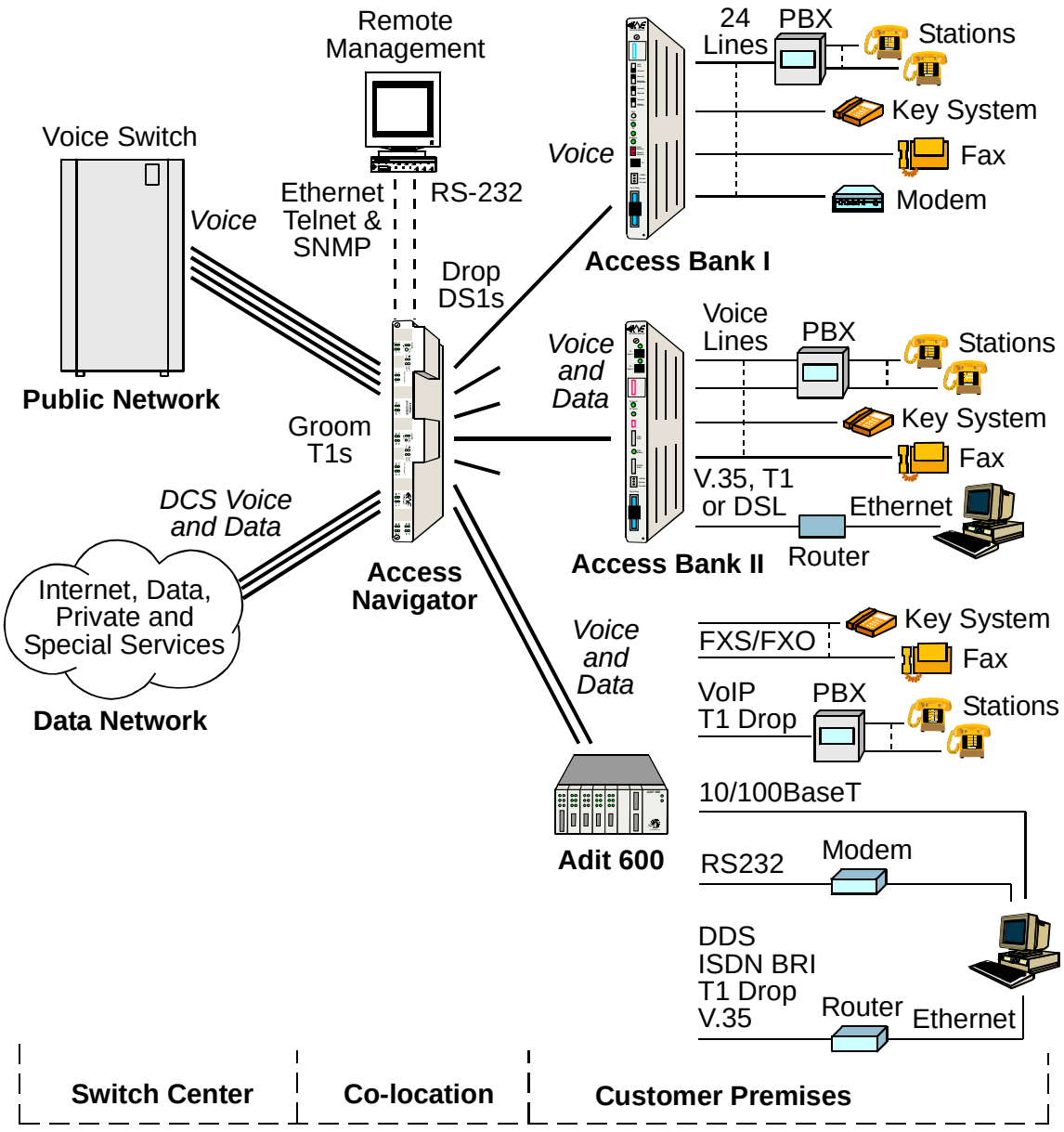

Figure 2-2. Access Navigator / DCS Service Manager Architecture

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Features and Benefits

Functions

The Access Navigator / DCS Service Manager is a transport element that combines the functions of a 32-port T1 digital crossconnect system, T1 channel/data service unit (CSU), T1 diagnostic test equipment, and Access Bank® II host controller into a modular chassis 1½ rack units high (see Figure 2-2). Ethernet SNMP, optional redundancy, and modular T1 expansion provide carrier-class service protection and management at either carrier or customer located T1 service access points.

Services

The Access Navigator provides all the grooming and filling functions of a 1/0 digital crossconnect system to maximize T1 usage. With carrier/customer demarcation testing, carriers are able to decrease maintenance costs and labor, while increasing service availability. Fractional voice and data services from multiple customers and applications are combined by the Access Navigator to save recurring backhaul transmission costs, and capital costs on switch or router ports.

Facilities

With both NEBS and customer premise certifications, the Access Navigator can be located in carrier racks or on customer walls. Space, power, and installation labor are dramatically reduced in comparison to old generation digital crossconnect and CSU or NIU shelves. Additional Quad T1 Framer cards can be installed while the Access Navigator is in service to provide from 4 to 32 DS1/CSU connection ports. TFTP and Xmodem utilities permit software updates to redundant systems without affecting service.

Management

Access Navigators provide management access via Ethernet SNMP, Telnet CLI, and RS-232 CLI (see Figure 2-3). Valet™ and NetworkValet™ EMS software provides a graphical user interface (GUI) for SNMP management. Flow-through provisioning of the remote Access Bank II and testing control over T1 connections reduce truck rolls and monitors voice and data service availability at customer locations.

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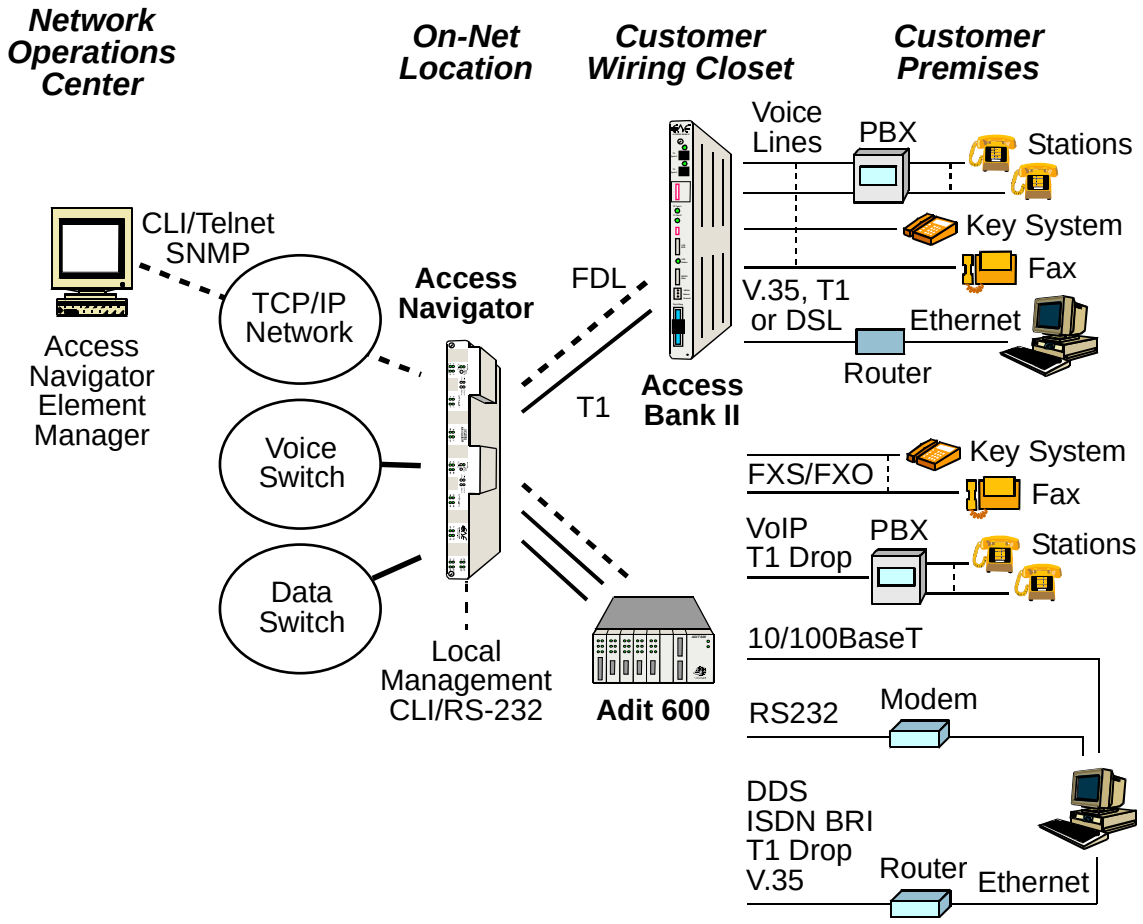

Figure 2-3. Access Navigator Management Architecture

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Configuration

- Hardware configuration: Modular construction with plug-in cards includes built-in circuit and network testing and fuse-less protection (see Figure 2-4).
- Software configuration: Operating system is stored in upgradeable flash memory. Configuration and provisioning data are stored in nonvolatile RAM, protected from power interruptions.

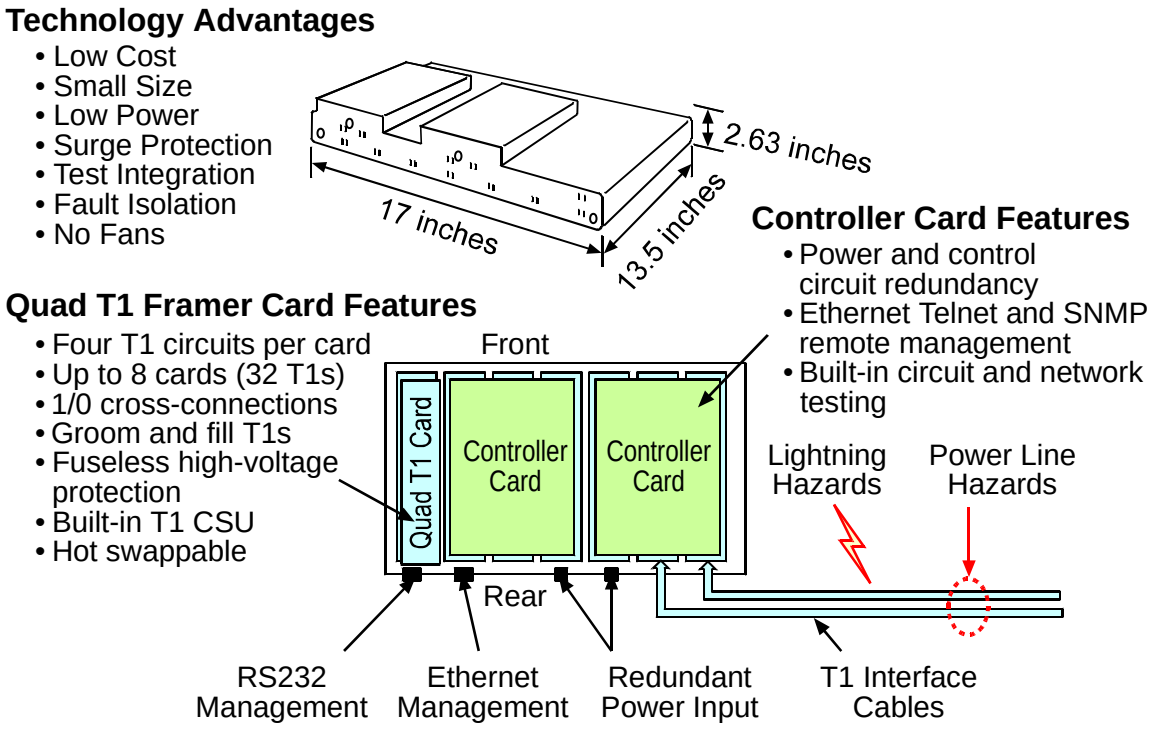

Figure 2-4. Access Navigator Hardware Configuration

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Applications

- T1 Service POP-In-A-Box: Customer-located T1 access management for carriers
- End-Office T1 Grooming: T1 access consolidation, provisioning, protection, and service management
- DCS Host Control of Access Bank II: Flow-through remote management and bandwidth grooming of Access Bank IIs
- PCS and Cellular Site T1 Bandwidth Management: Drop, groom, and test multiple T1 connections between cell sites and hubs

Interfaces

- DS1 Interface: Two Champ® 64-pin connectors with 32 DS1 circuits, one for receive (input) and one for transmit (output)
- RJ45C Interface: Timing input connector for external clock source (such as BITS)
- RS-232 Interface: DB9 (DE9) female connector for CLI management by craft terminal or computer with terminal emulation software
- Ethernet Interface: 10Base-T connector for SNMP and Telnet CLI management

Specifications

DCS Operation

- Up to 32 T1s per system
- DCS 1/0 interface supports crossconnects at DS0 level
- Crossconnects up to 24 contiguous DS0s between T1s with one command
- Redundancy, 1:1 controller & power conversion

DS1 Interface

- Four T1s per line card, hot swappable
- Line rate: 1.544 Mb/s ± 32ppm
- Line code: B8ZS or AMI
- Framing: D4 (SF) or ESF
- DS1 receive sensitivity: –28dB to +1.5dB
- Line build-outs:
  DSX-1 (0 to 660 ft. in 5 steps)
  CSU (0 dB, –7.5 dB, –15 dB, –22.5dB)

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- ANSI T1.403, Section 6 & 7 (jitter, pulse mask transmission, receive sensitivity, framing formats)
- Built-in CSU with loopback and BERT for testing the T1s

System Clocking

- Primary and secondary sources from: DS1s, external clock source (such as BITS) or internal clock (minimum Stratum 4)
- Automatic clock switching and holdover

Signaling

- Robbed-bit and clear channel connections at DS0 level
- FXS/FXO loop start and ground start robbed bit signaling
- E&M robbed bit signaling

Management Interfaces

- Command line interface (CLI) for provisioning and maintenance
- RS-232 interface for local CLI
- Ethernet Telnet support for remote CLI
- Ethernet SNMP uses Telcordia® standard MIB for DS1 interfaces (RFC-1406)
- TFTP and Xmodem support for flash memory software upgrades

Protocols

- Command Line Interface (CLI)
- Simple Network Management Protocol (SNMP)
- Telnet /TFTP

Alarms

- Critical, Major, and Minor alarm levels
- DS1 alarms for LOS, LOF, AIS, and RAI
- Front panel LED indicators
- Output signal: relay contact closure and LED indication
  Maximum relay contact rating: 110V AC or DC @ 1A
- Alarm inputs from dry contact closures
  Maximum input rating: 60V DC

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Compliance

USA

- UL 1950, 3rd Edition
- FCC Part 15, Class A
- FCC Part 68
- NEBS Level 3 for Type 2 and 4 equipment
  GR-1089-CORE
  GR-63-CORE

CANADA

- CSA C22.2 No. 950.95
- ICES-003, Class A
- CS-03

Power

- Input power: –42 to –60 VDC @ 1.5A
- Dual feed DC power input terminals
- Power dissipation: 65 watts (225 Btu/hr.), fully equipped
- Solid-state (fuse-less) over-voltage and over-current protection

Environmental

- Operating temperature: –5°C to +45°C (23°F to 113°F), up to +55°C short term (NEBS)
- Solid-state over-temperature protection
- Relative humidity: 0 to 95%, non-condensing
- No fans; Passive thermal management

Physical

- Dimensions: 17" x 13.5" x 2.63"
- Weight: 10 lbs. (4.54 kg)
- Mounts in 19 and 23 inch racks
- Optional wall mount brackets

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Compliance Requirements

FCC Requirements

This equipment complies with Part 15 and Part 68 of the Federal Communications Commission (FCC) Rules.

Part 15, Class A

This equipment has been tested and found to comply with the limits for a Class A digital device in accordance with Part 15 of the FCC Rules. These limits provide reasonable protection against harmful interference when equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions in this manual may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

The following cables, when connected to this equipment, must be shielded to maintain FCC Part 15 compliance:

- Both DSX-1 cables
- RS-232 cable

Part 68

This equipment complies with Part 68 of the Federal Communications Commission rules. The silkscreen on the top cover of this equipment includes the FCC registration number.

You must supply the following information to the telephone company, if they request it.

- FCC Registration Number: 2Z6USA-33482-DD-N
- Service Center in the USA:

Carrier Access Corporation
5395 Pearl Parkway
Boulder CO 80301-2490
Phone 800-495-5455

If this equipment has been found to cause harm to the telephone network, the telephone company will notify you in advance. If advance notice proves impractical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe such action is necessary.

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

The telephone company may make changes in it's facilities, equipment, operations or procedures that could affect the operation of your equipment. If this happens, the telephone company will

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provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you need to make repairs or modifications to the equipment, please first contact Carrier Access Corporation for repair, modification, and warranty information. Customer repairs and modifications are limited to the replacement of circuit boards; any other repairs or modifications will void your warranty.

Facility Interface Codes (FIC)

FIC CODES	DESCRIPTION
04DU9-BN	1.544 Mbps Superframe Format (SF) without Line Power
04DU9-DN	1.544 Mbps Superframe (SF) and B8ZS without Line Power
04DU9-1KN	1.544 Mbps ANSI, ESF without Line Power
04DU9-1SN	1.544 Mbps ANSI, ESF, and B8ZS without Line Power

Service Order Codes (SOC)

SOC CODES	DESCRIPTION
6.0F	Combinations of equipment provide full protection to digital services. Billing protection and encoded analog protection are provided either by including auxiliary equipment within the registration envelope or by use of a separately registered device.

Telcordia (Bellcore) Requirements

This equipment conforms with Telcordia® standard GR-1089-CORE, New Equipment Building System (NEBS), requirements for intra-building (inside plant) Type 2 and Type 4.

To maintain compliance with the GR-1089-CORE requirements to prevent EMI/EMC radio frequency interference with other equipment, the DSX-1 and RS-232 cables must be shielded and have ferrite bead RFI suppressors.

UL Requirements

This equipment conforms with Underwriters Laboratory standard UL 1950 (supersedes UL 1459). To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

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CSA Requirements

This telecommunication network equipment conforms with Canadian Standards Association (CSA) standard C22.2 No. 950.95. To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

Ordering Information

Part Number	Item	Description
930-0202	AN/DCS/R/32	Access Navigator DCS Service Manager, 32 T1 Redundant Package: 2 AN-DCS Controller Cards 8 AN-Quad T1 Framer Cards
930-0200	AN-Case	Access Navigator redundant NEBS chassis and backplane. Chassis holds two Controller cards and eight Quad T1 Framer cards (32 T1 circuits). Order cards separately.
740-0016	AN-DCS Controller Card	Access Navigator Controller card with Digital Crossconnect System (DCS) software.
740-0018	Quad T1 Framer Card	Access Navigator Quad T1 Framer card terminates 4 T1 interfaces from switch, customer site, or data network.
005-0025	DSX-1 Cable	64-pin DSX-1 cable, 10 feet long, male/male. Two cables must be ordered per Access Navigator, one TX, one RX. May be used for DS1 and DSX-1 transmission levels.
005-0030	DSX-1 Cable	64-pin DSX-1 cable, 25 feet long (see 005-0025).
710-0153	19”/23” Universal Mounting Brackets	Universal mounting brackets and screws for 19 and 23 inch equipment racks. This bracket set is included with all Access Navigator unit purchases.
710-0003	19” Vertical Mount Crossbars	Two heavy-duty 19 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
710-0004	23” Vertical Mount Crossbars	Two heavy-duty 23 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
770-0079	AN-Manual	Access Navigator User Manual is included with all Access Navigator unit purchases.

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CHAPTER 3

Access Navigator / GR-303 + Data Host

In this Chapter

- Overview ... 3-2
- System Architecture ... 3-3
- Features and Benefits ... 3-4
- GR-303 Services ... 3-4
- DCS Services ... 3-6
- Management Architecture ... 3-7
- Configuration ... 3-9
- Applications ... 3-10
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- Specifications ... 3-11
- Compliance Requirements ... 3-14
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Overview

The Access Navigator® / GR-303 + Data Host offers a highly integrated solution for combining multi-line local voice and data services on customer T1 access lines. Using the Telcordia® standard GR-303 switching protocol, up to 672 customer telephone channels can be assigned on a call-by-call basis to Class 5 local digital switch T1 connections. In addition to the concentration and management of CLASS® voice services, the Access Navigator grooms, and optionally concentrates, fractional T1 data connections from customer locations

.

Figure 3-1 Access Navigator / GR-303 + Data Host

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System Architecture

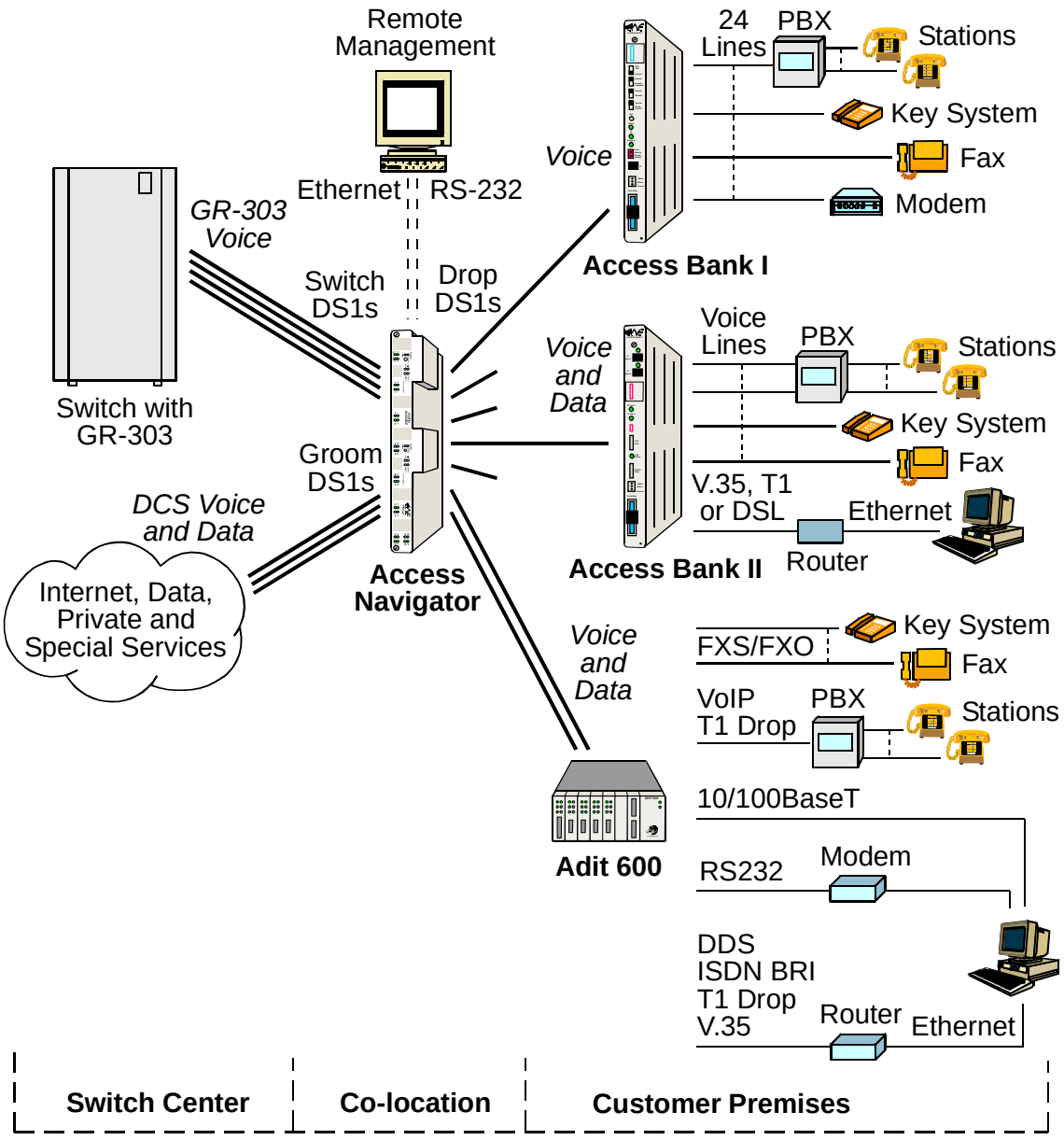

Figure 3-2. Access Navigator / GR-303 + Data Host Architecture

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Features and Benefits

The Access Navigator / GR-303 + Data Host is a transport element that combines the functions of a GR-303 digital terminal, 32-port T1 digital crossconnect system, T1 channel/data service unit (CSU), T1 diagnostic test equipment, and Access Bank® II host controller into a modular chassis 1½ rack units high. Ethernet SNMP, optional redundancy, and modular T1 expansion provide carrier-class service protection and management at either carrier or customer located T1 service access points.

Access Navigator / GR-303 + Data Host offers an integration of:

- 32 T1 port GR-303 remote digital terminal
- GR-303 to TR-08 translation for CA's Access Bank® I/TR-08
- GR-303 Direct Inward Dial (DID) support when used with Lucent 5ESS switches
- Digital crossconnect system
- T1 CSUs and demarcation testing
- Ethernet Telnet and SNMP management
- Optional Controller redundancy
- Modular Quad T1 expansion
- NEBS Certified

GR-303 Services

The Access Navigator / GR-303 + Data Host provides T1 local voice and data services to multiple customers (see Figure 3-3). Using GR-303 switching protocol for call concentration, the Access Navigator reduces recurring backhaul transmission costs and switch port costs by up to a factor of 4.

By using CA's Access Bank® II and Adit 600 products at the customer premise, an end-to-end distributed voice and data digital loop carrier and remote management system is provided. Standard T1 connections from customer PBXs and key systems may be concentrated or bypassed from the GR-303 groups.

The power of a 32 T1 port voice and data switch/concentrator and remote service management system is contained in only 1½ rack units of space. Integrated testing and optional common equipment redundancy assure carrier-class service availability.

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CA's Access Navigator / GR-303 + Data Host, together with the Access Bank II and Adit 600, bring cost-effective concentration and remote management to competitive local carriers with a new level of serviceability and space efficiency.

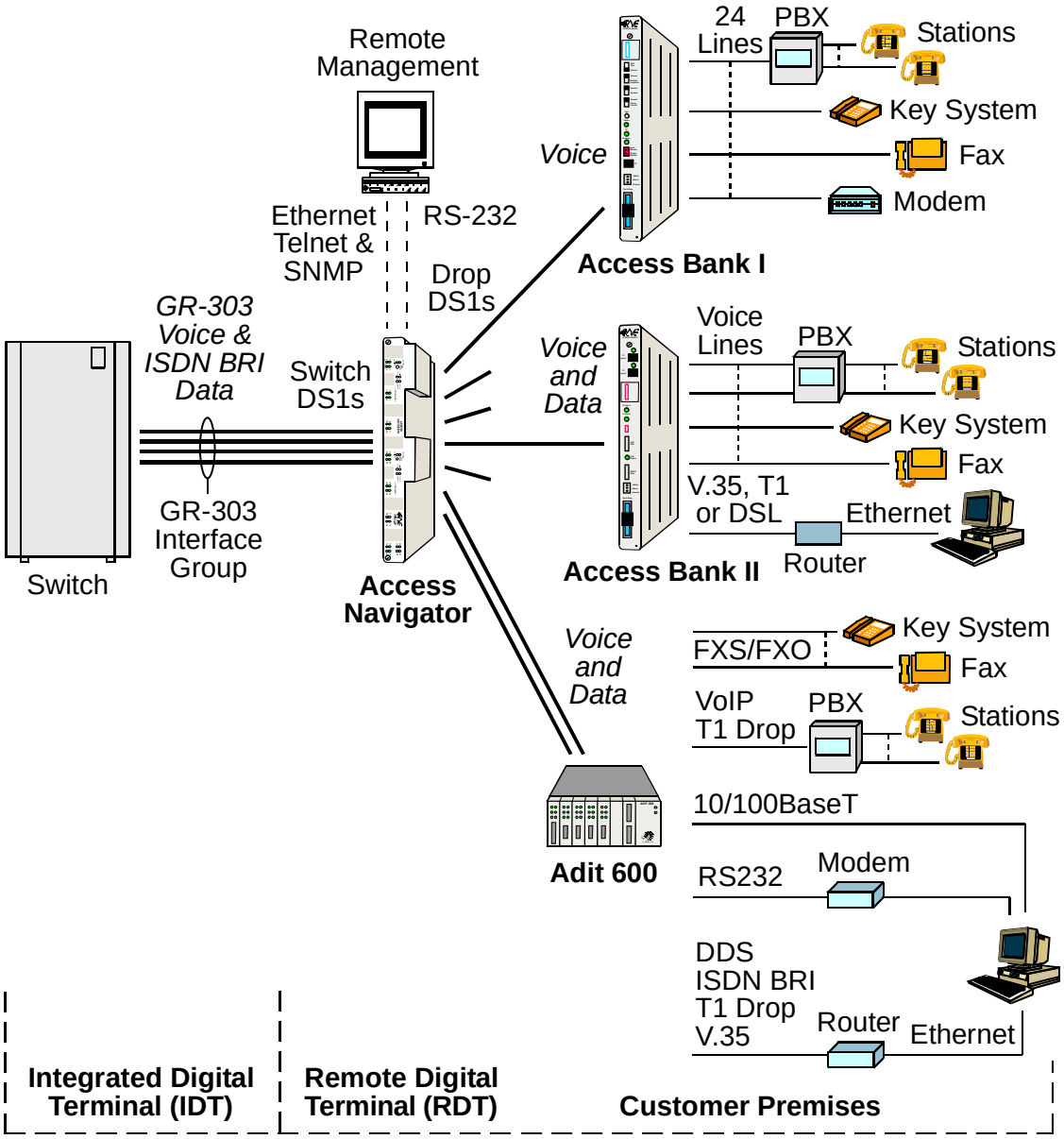

Figure 3-3. Access Navigator GR-303 + Data Host Architecture

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DCS Services

The Access Navigator provides all the grooming and filling functions of a 1/0 digital crossconnect system (DCS) to maximize T1 usage. With carrier/customer demarcation testing, carriers are able to decrease maintenance costs and labor, while increasing service availability. Fractional voice and data services from multiple customers and applications are combined by the Access Navigator to save recurring backhaul transmission costs, and capital costs on switch or router ports.

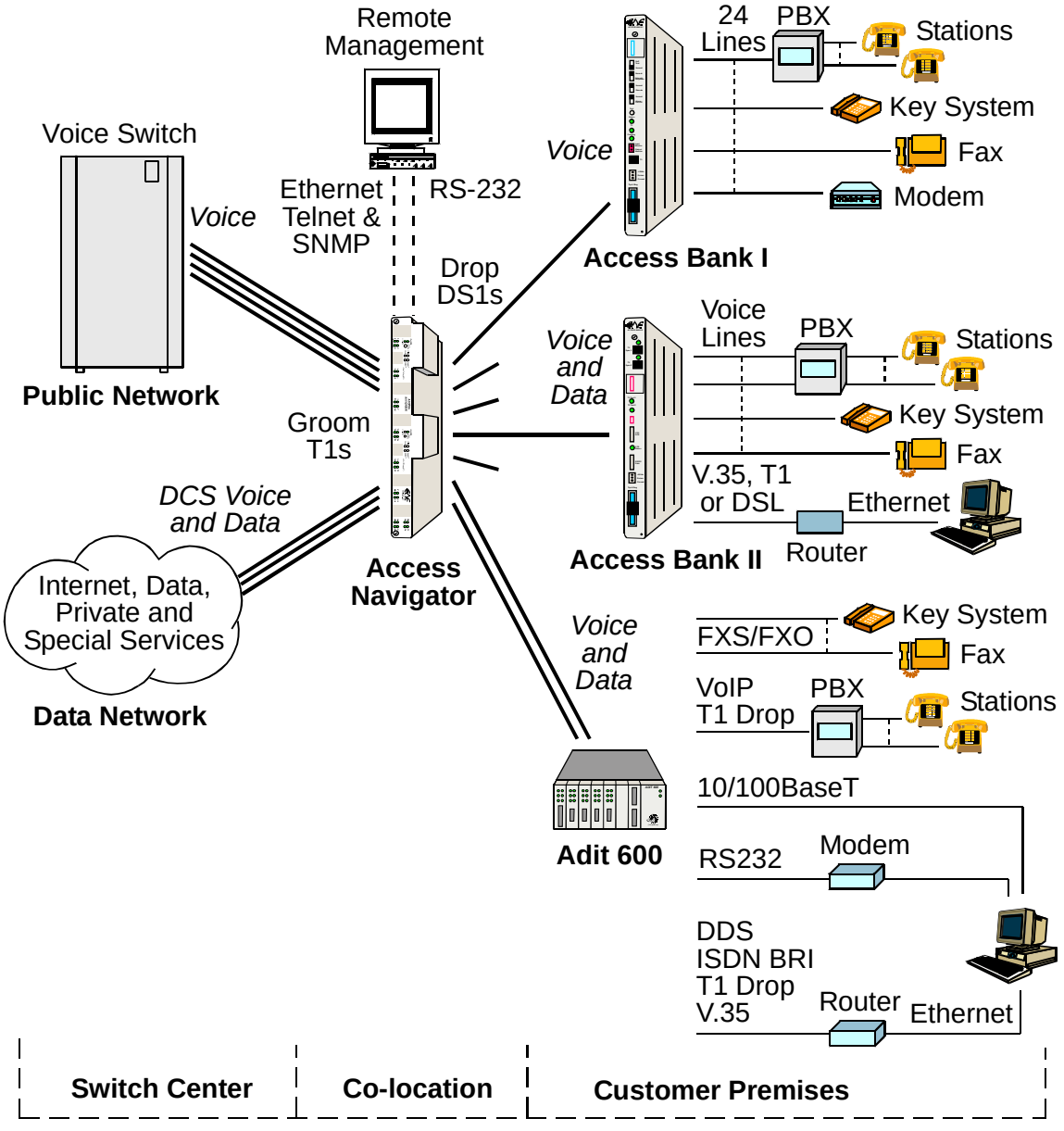

Figure 3-4. Access Navigator Data Host Architecture

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Management Architecture

Access Navigators provide management access via Ethernet SNMP, Telnet CLI, and RS-232 CLI. Valet™ and NetworkValet™ EMS software provides a graphical user interface (GUI) for SNMP management. Flow-through provisioning of the remote Access Bank II and testing control over T1 connections reduce truck rolls and monitors voice and data service availability at customer locations.

IP DS0 Management

The Access Navigator can use IP management commands and dedicated DS0s to manage up to 24 remote Adit 600 terminals. IP DS0 management uses a colocated Adit 600 terminal with an IP Router card to redirect IP messages between the Access Navigator's IP port and the 24 DS0s on a groom DS1. The Access Navigator then cross-connects the groom DS0s to a dedicated drop DS0 going to each remote Adit 600. Customers wishing to conserve IP addresses can use an Ethernet hub or router providing port addresses translation (NAT) to isolate the IP DS0 management network.

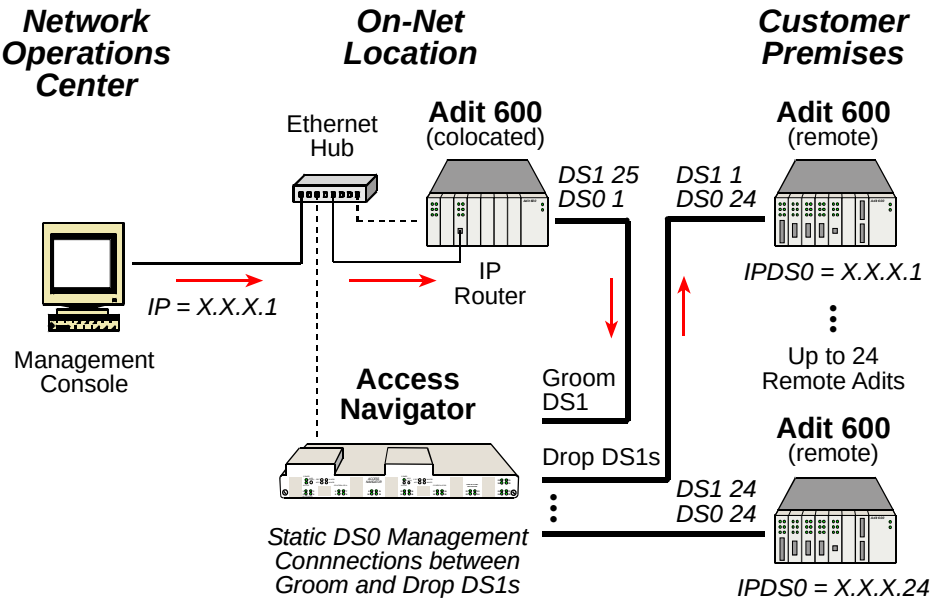

Figure 3-5. Access Navigator IP DS0 Management Architecture

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FDL Management

When T1 Type I lines are available, the Access Navigator can use the ESF Faciltiy Data Link channel to manage remote Access Bank II and Adit 600 terminals.

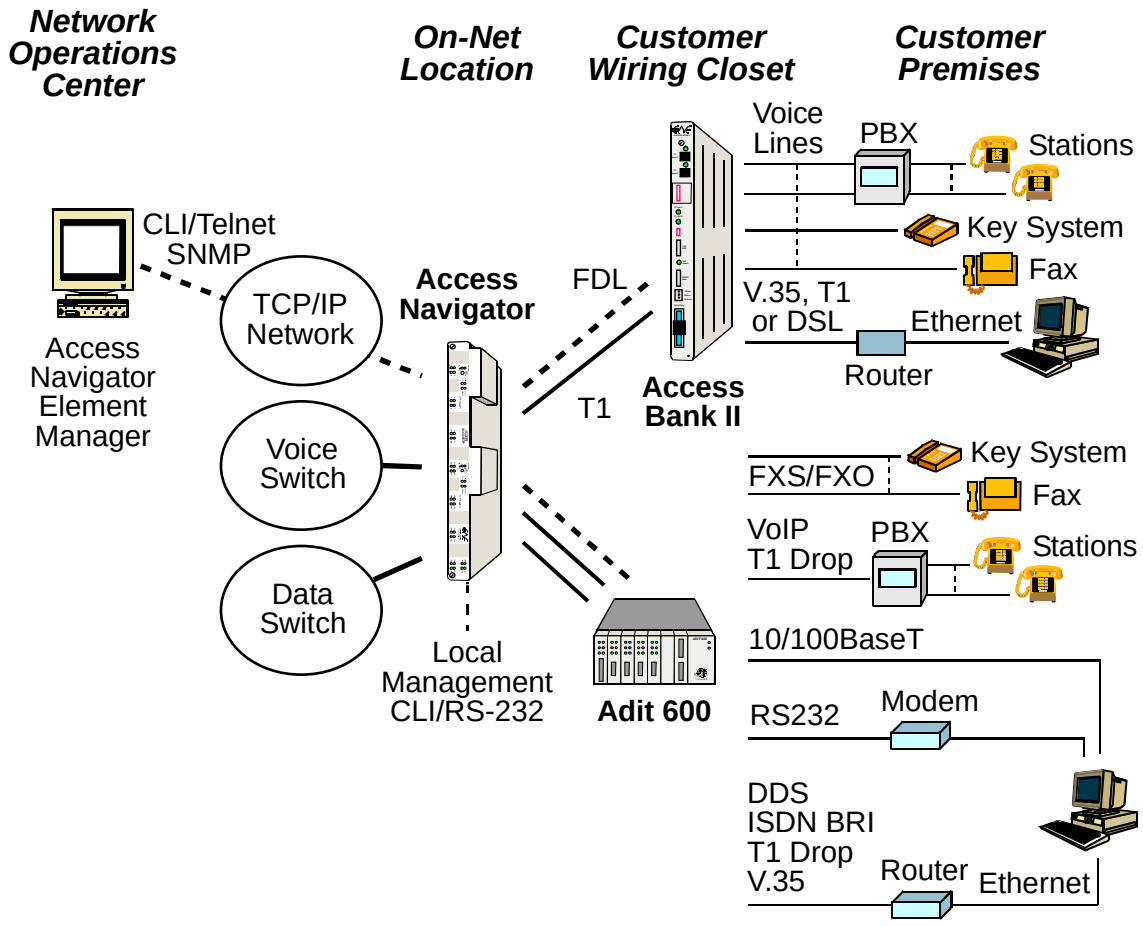

Figure 3-6. Access Navigator FDL Management Architecture

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Configuration

The Access Navigator / GR-303 + Data Host combines call processing and concentration capabilities of a GR-303 digital loop carrier (DLC) system with the functionality of a miniature 1/0 digital crossconnect switch (DCS). Providing up to 32 DS1 ports (768 DS0s) in one small package, the Access Navigator fits easily into small collocation spaces and phone closets.

- Hardware configuration: Modular construction with plug-in cards includes built-in circuit and network testing and fuse-less protection (see Figure 3-7)
- Software configuration: Operating system is stored in upgradeable flash memory. Configuration and provisioning data are stored in nonvolatile RAM, protected from power interruptions.

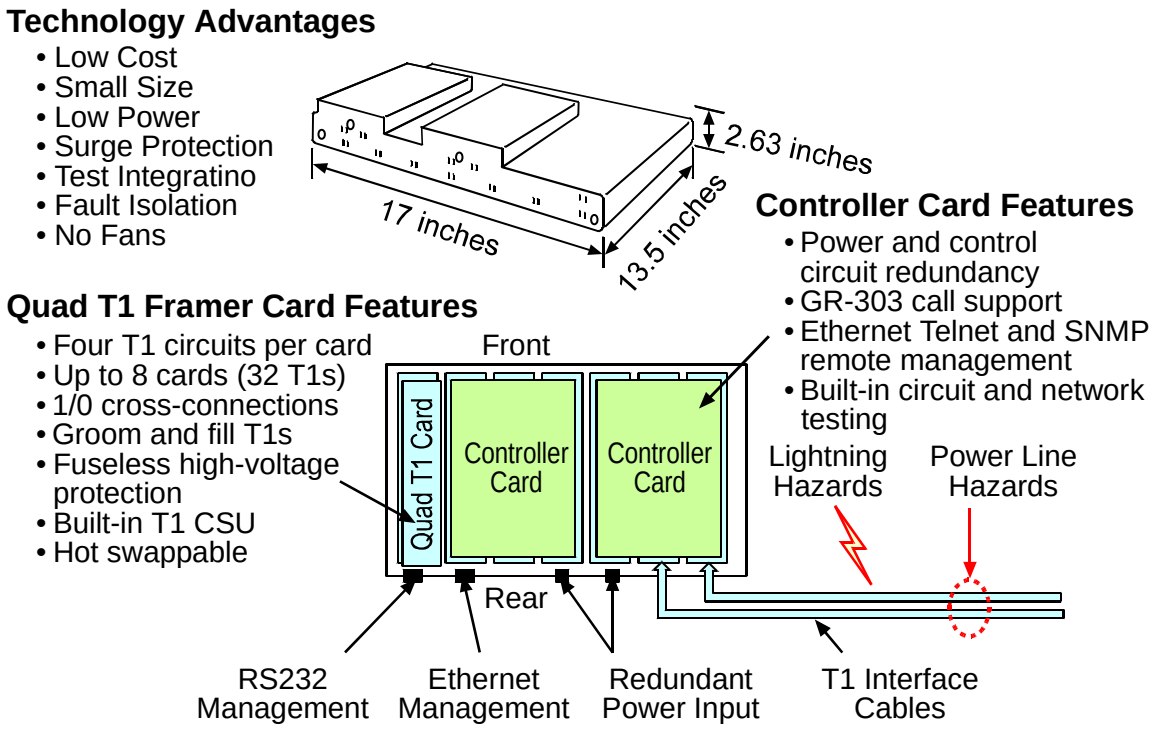

Figure 3-7. Access Navigator Hardware Configuration

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Applications

- T1 Service POP-In-A-Box: Customer-located T1 access management for carriers
- Call Concentration: Variable concentration of voice calls for more efficient use of backhaul T1s and switch resources
- End-Office T1 Grooming: T1 access consolidation, provisioning, protection, and service management
- Host Control of Access Bank II: Flow-through remote management and bandwidth grooming of Access Bank IIs

Interfaces

- DS1 Interface: Two Champ® 64-pin connectors with 32 DS1 circuits, one for receive (input) and one for transmit (output)
- RJ45C Interface: Timing input connector for external clock source (such as BITS)
- RS-232 Interface: DB9 (DE9) connector for CLI management by craft terminal or computer with terminal emulation software
- Ethernet Interface: 10Base-T connector for SNMP and Telnet CLI management

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Specifications

GR-303 Operation

- Up to 32 T1s per system
- Primary and redundant protection for EOC and TMC
- GR-303 to TR-08 translation for CA's Access Bank I/TR-08
- GR-303 Direct Inward Dial (DID) support for Lucent 5ESS switches
- GR-303 line concentration of 4:1 TDM ISDN BRI services
- Alarm and maintenance support for DS1 terminations
- Compatible with Lucent, Nortel, and Siemens switches
- Configurable concentration ratios
- Programmable call reference values (CRVs)
- Redundancy, 1:1 controller & power conversion

Crossconnects

- DCS 1/0 interface supports crossconnects at DS0 level
- Crossconnects up to 24 contiguous DS0s between T1s with one command

DS1 Interface

- Four T1s per line card, hot swappable
- Line rate: 1.544 Mb/s ± 32ppm
- Line code: B8ZS or AMI
- Framing: D4 (SF) or ESF
- DS1 receive sensitivity: –28dB to +1.5dB
- Line build-outs:
  DSX-1 (0 to 660 ft. in 5 steps)
  CSU (0 dB, –7.5 dB, –15 dB, –22.5dB)
- ANSI T1.403, Section 6 & 7 (jitter, pulse mask transmission, receive sensitivity, framing formats)
- Built-in CSU with loopback and BERT for testing the T1s

System Clocking

- Primary and secondary sources from: DS1s, external clock source (such as BITS) or internal clock (minimum Stratum 4)
- Automatic clock switching and holdover

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GR-303 Signaling

- GR-303 ABCD robbed-bit signal codes
- GR-303 Direct Inward Dial (DID) signaling for Lucent switches
- GR-303 4:1 TDM mode support for ISDN BRI
- FXS loop start and ground start

DCS Signaling

- Robbed-bit and clear channel connections at DS0 level
- FXS/FXO loop start and ground start
- E&M robbed bit signaling

Management Interfaces

- Command line interface (CLI) for provisioning and maintenance
- RS-232 interface for local CLI
- Ethernet Telnet support for remote CLI
- Ethernet SNMP uses Telcordia® standard MIB for DS1 interfaces (RFC-1406)
- TFTP and Xmodem support for flash memory software upgrades

Protocols

- Command Line Interface (CLI)
- Simple Network Management Protocol (SNMP)
- Telcordia® GR-303
- Telnet
- TFTP and Xmodem support for flash memory software upgrades

Alarms

- Critical, Major, and Minor alarm levels
- DS1 alarms for LOS, LOF, AIS, and RAI
- Front panel LED indicators
- Output signal: relay contact closure and LED indication
  Maximum relay contact rating: 110V AC or DC @ 1A
- Alarm inputs from dry contact closures
  Maximum input rating: 60V DC

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Compliance

USA

- UL 1950, 3rd Edition
- FCC Part 15, Class A
- FCC Part 68
- NEBS Level 3 for Type 2 and 4 equipment
  GR-1089-CORE
  GR-63-CORE

CANADA

- CSA C22.2 No. 950.95
- ICES-003, Class A
- CS-03

Power

- Input power: –42 to –60 VDC @ 1.5A
- Dual feed DC power input terminals
- Power dissipation: 65 watts (225 Btu/hr.), fully equipped
- Solid-state (fuse-less) over-voltage and over-current protection

Environmental

- Operating temperature: –5°C to +45°C (23°F to 113°F), up to +55°C short term (NEBS)
- Solid-state over-temperature protection
- Relative humidity: 0 to 95%, non-condensing
- No fans; Passive thermal management

Physical

- Dimensions: 17" x 13.5" x 2.63"
- Weight: 10 lbs. (4.54 kg)
- Mounts in 19 and 23 inch racks
- Optional wall mount brackets

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Compliance Requirements

FCC Requirements

This equipment complies with Part 15 and Part 68 of the Federal Communications Commission (FCC) Rules.

Part 15, Class A

This equipment has been tested and found to comply with the limits for a Class A digital device in accordance with Part 15 of the FCC Rules. These limits provide reasonable protection against harmful interference when equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions in this manual may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

The following cables, when connected to this equipment, must be shielded to maintain FCC Part 15 compliance:

- Both DSX-1 cables
- RS-232 cable

Part 68

This equipment complies with Part 68 of the Federal Communications Commission rules. The silkscreen on the top cover of this equipment includes the FCC registration number.

You must supply the following information to the telephone company, if they request it.

- FCC Registration Number: 2Z6USA-33482-DD-N
- Service Center in the USA:

Carrier Access Corporation
5395 Pearl Parkway
Boulder CO 80301-2490
Phone 800-495-5455

If this equipment has been found to cause harm to the telephone network, the telephone company will notify you in advance. If advance notice proves impractical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe such action is necessary.

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of your equipment. If this happens, the telephone company will

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provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you need to make repairs or modifications to the equipment, please first contact Carrier Access Corporation for repair, modification, and warranty information. Customer repairs and modifications are limited to the replacement of circuit boards; any other repairs or modifications will void your warranty.

Facility Interface Codes (FIC)

FIC CODES	DESCRIPTION
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04DU9-DN	1.544 Mbps Superframe (SF) and B8ZS without Line Power
04DU9-1KN	1.544 Mbps ANSI, ESF without Line Power
04DU9-1SN	1.544 Mbps ANSI, ESF, and B8ZS without Line Power

Service Order Codes (SOC)

SOC CODES	DESCRIPTION
6.0F	Combinations of equipment provide full protection to digital services. Billing protection and encoded analog protection are provided either by including auxiliary equipment within the registration envelope or by use of a separately registered device.

Telcordia (Bellcore) Requirements

This equipment conforms with Telcordia® standard GR-1089-CORE, New Equipment Building System (NEBS), requirements for intra-building (inside plant) Type 2 and Type 4.

To maintain compliance with the GR-1089-CORE requirements to prevent EMI/EMC radio frequency interference with other equipment, the DSX-1 and RS-232 cables must be shielded and have ferrite bead RFI suppressors.

UL Requirements

This equipment conforms with Underwriters Laboratory standard UL 1950 (supersedes UL 1459). To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

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CSA Requirements

This telecommunication network equipment conforms with Canadian Standards Association (CSA) standard C22.2 No. 950.95. To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

Ordering Information

Part Number	Item	Description
930-0201	AN/GR-303/R/32	Access Navigator GR-303 + Data Host, 32 T1 Redundant Package: 2 AN-GR-303 Controller Cards 8 AN-Quad T1 Framer Cards
930-0200	AN-Case	Access Navigator redundant NEBS chassis and backplane. Chassis holds two Controller cards and eight Quad T1 Framer cards (32 T1 circuits). Order cards separately.
740-0017	AN-GR-303 Controller Card	Access Navigator Controller card with GR-303 and DCS software.
740-0018	Quad T1 Framer Card	Access Navigator Quad T1 Framer card terminates 4 T1 interfaces from switch, customer site, or data network.
005-0025	DSX-1 Cable	64-pin DSX-1 cable, 10 feet long, male/male. Two cables must be ordered per Access Navigator, one TX, one RX. May be used for DS1 and DSX-1 transmission levels.
005-0030	DSX-1 Cable	64-pin DSX-1 cable, 25 feet long (see 005-0025).
710-0153	19”/23” Universal Mounting Brackets	Universal mounting brackets and screws for 19 and 23 inch equipment racks. This bracket set is included with all Access Navigator unit purchases.
710-0003	19” Vertical Mount Crossbars	Two heavy-duty 19 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
710-0004	23” Vertical Mount Crossbars	Two heavy-duty 23 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
770-0079	AN-Manual	Access Navigator User Manual is included with all Access Navigator unit purchases.

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CHAPTER 4

Access Navigator / GR-303 Host with P-Phone

In this Chapter

- Overview ... 4-2
- System Architecture ... 4-3
- Features and Benefits ... 4-4
- GR-303 Services ... 4-4
- P-Phone Services ... 4-6
- DCS Services ... 4-7
- Management Architecture ... 4-8
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- Specifications ... 4-12
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- Ordering Information ... 4-17

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Overview

The Access Navigator® / GR-303 Host with P-Phone offers a highly integrated solution for combining multi-line local voice and data services on customer T1 access lines. Using the Telcordia® standard GR-303 switching protocol, up to 672 customer telephone channels can be assigned on a call-by-call basis to Class 5 local digital switch T1 connections. When connected to a Nortel DMS switch providing Nortel Proprietary Phone (P-Phone) Centrex service, the Access Navigator can support up to 384 P-Phone channels from up to 14 remote Adit 600s. In addition to the concentration and management of CLASS® voice services, the Access Navigator grooms, and optionally concentrates, fractional T1 data connections from customer locations.

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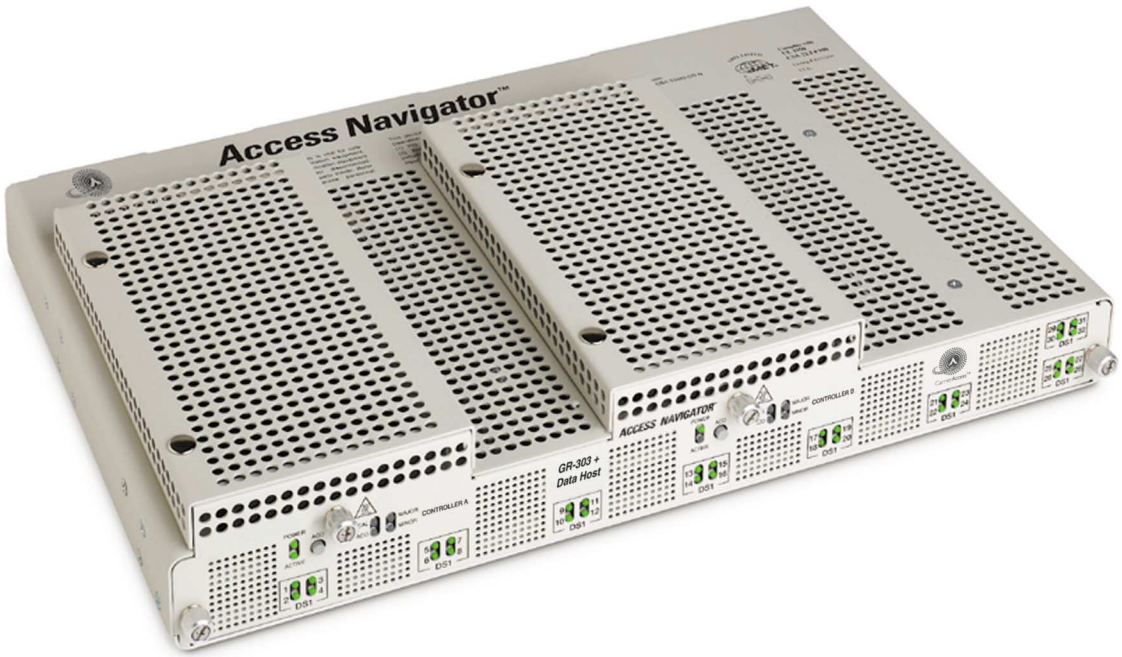

Figure 4-1 Access Navigator / GR-303 Host with P-Phone

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System Architecture

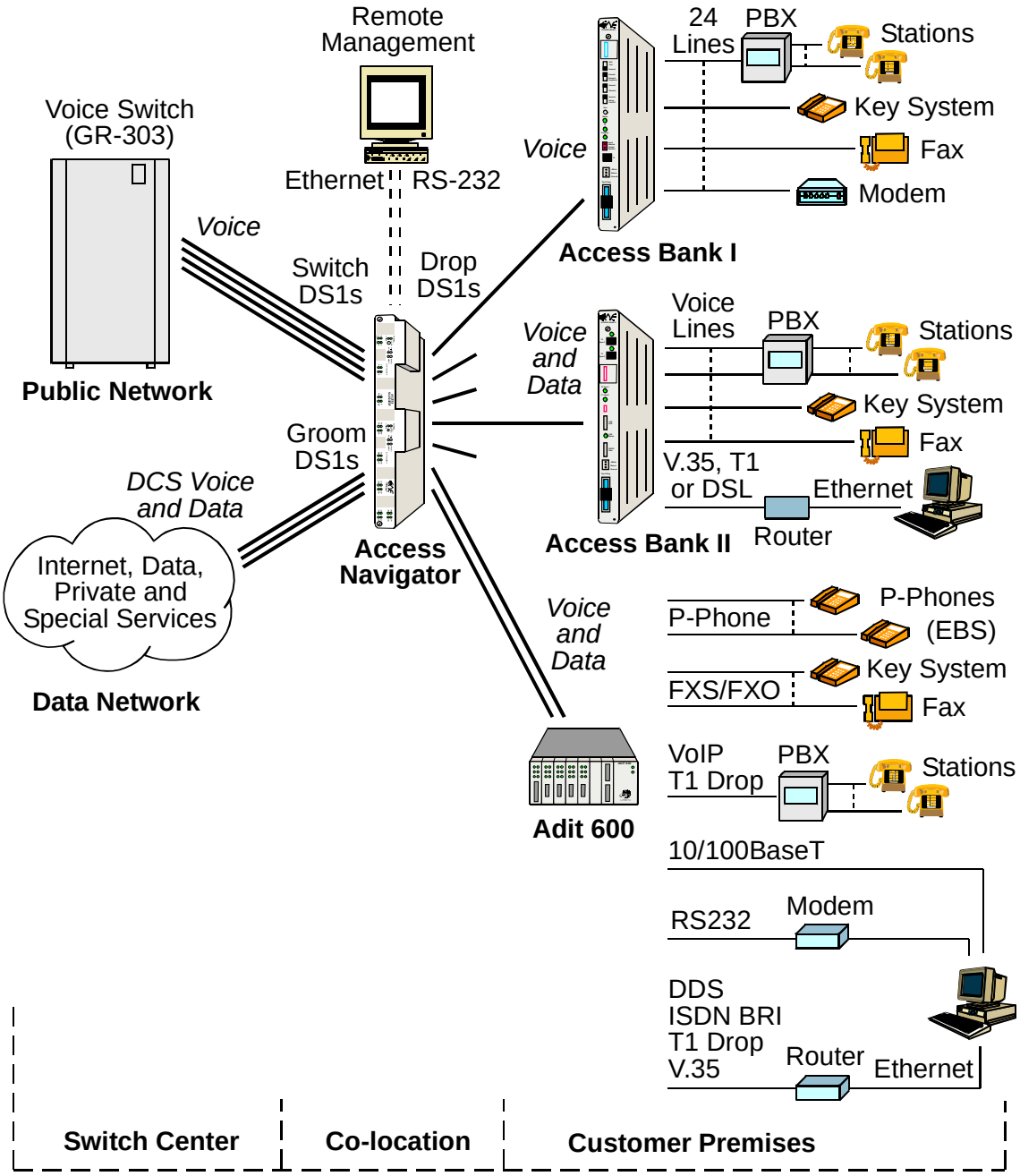

Figure 4-2. Access Navigator / GR-303 with P-Phone Architecture

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Features and Benefits

The Access Navigator / GR-303 with P-Phone is a transport element that combines the functions of a GR-303 digital terminal, 32-port T1 digital crossconnect system, T1 channel/data service unit (CSU), T1 diagnostic test equipment, and Access Bank® II host controller into a modular chassis 1½ rack units high. Ethernet SNMP, optional redundancy, and modular T1 expansion provide carrier-class service protection and management at either carrier or customer located T1 service access points.

Access Navigator / GR-303 Host with P-Phone offers an integration of:

- 32 T1 port GR-303 remote digital terminal
- GR-303 to TR-08 translation for CA's Access Bank® I/TR-08
- GR-303 Direct Inward Dial (DID) support when used with Lucent 5ESS switches
- P-Phone (EBS) support with GR-303 voice concentration when used with Nortel DMS switches and remote Adit 600 terminals equipped with P-Phone service cards
- Digital crossconnect system
- T1 CSUs and demarcation testing
- Ethernet Telnet and SNMP management
- Optional Controller redundancy
- Modular Quad T1 expansion
- NEBS Certified

GR-303 Services

The Access Navigator / GR-303 Host with P-Phone provides T1 local voice, P-Phone, and data services to multiple customers (Figure 4-3). Using GR-303 switching protocol for call concentration, the Access Navigator reduces recurring backhaul transmission costs and switch port costs by up to a factor of 4.

By using CA's Access Bank® II and Adit 600 products at the customer premise, an end-to-end distributed voice and data digital loop carrier and remote management system is provided. Standard T1 connections from customer PBXs and key systems may be concentrated or bypassed from the GR-303 groups.

The power of a 32 T1 port voice and data switch/concentrator and remote service management system is contained in only 1½ rack units of space. Integrated testing and optional common equipment redundancy assure carrier-class service availability.

CA's Access Navigator / GR-303 Host with P-Phone, together with the Access Bank II and Adit 600, bring cost-effective concentration and remote management to competitive local carriers with a new level of serviceability and space efficiency.

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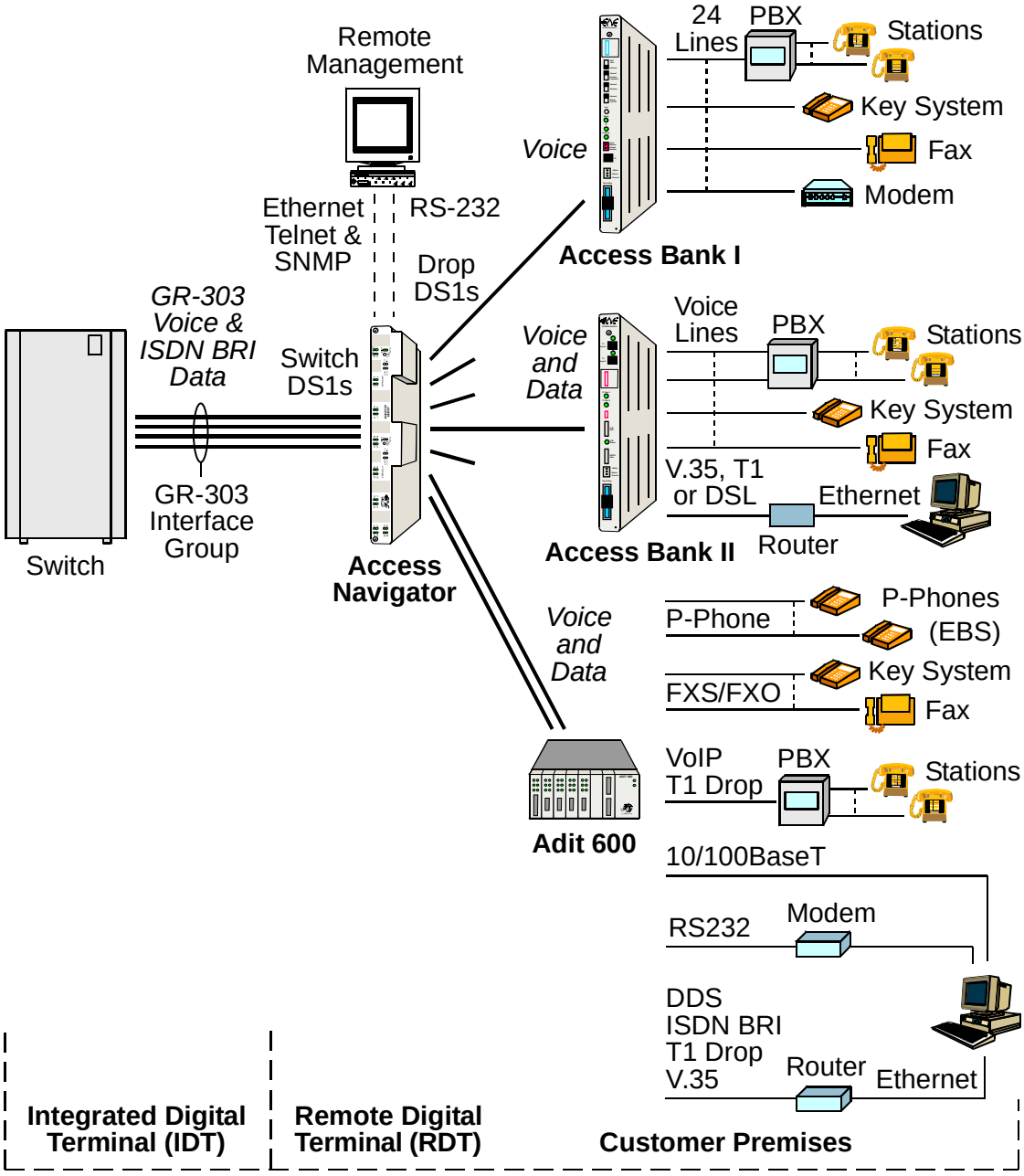

Figure 4-3. Access Navigator / GR-303 Host with P-Phone Architecture

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P-Phone Services

The Access Navigator / GR-303 Host with P-Phone includes Nortel Proprietary Phone (P-Phone) Centrex service support using remote Adit 600 terminals with P-Phone service cards. The cards convert the customer's analog P-Phone signals to more efficient digital loop carriers. These digital signals that are then transmitted over DS0s on the Access Navigator's drop DS1.

Command and signaling information for all P-Phones is carried by message packets sent over the IP DS0 management channel between the Access Navigator and remote Adit 600, then over the GR-303 EOC channel between the Access Navigator and the Nortel DMS switch. The Access Navigator can support up to 384 P-Phone channels originating from up to 14 remote Adit 600s. For a detailed description of supported P-Phone features, see the *Adit 600 User Manual*.

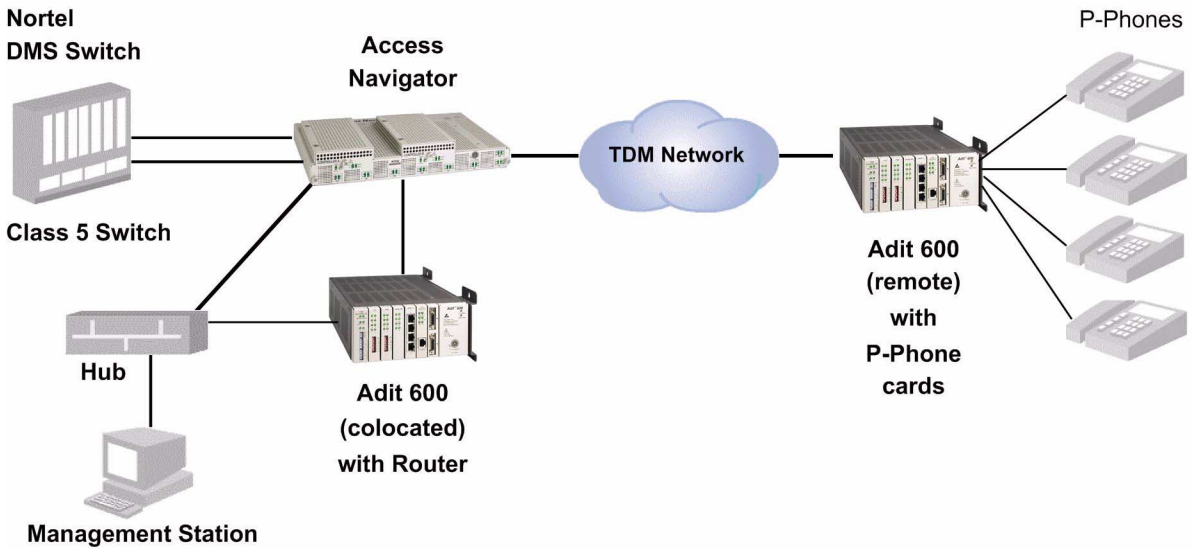

Figure 4-4 P-Phone Service Support Using Adit 600 Terminals

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DCS Services

The Access Navigator provides all the grooming and filling functions of a 1/0 digital crossconnect system (DCS) to maximize T1 usage. With carrier/customer demarcation testing, carriers are able to decrease maintenance costs and labor, while increasing service availability. Fractional voice and data services from multiple customers and applications are combined by the Access Navigator to save recurring backhaul transmission costs, and capital costs on switch or router ports.

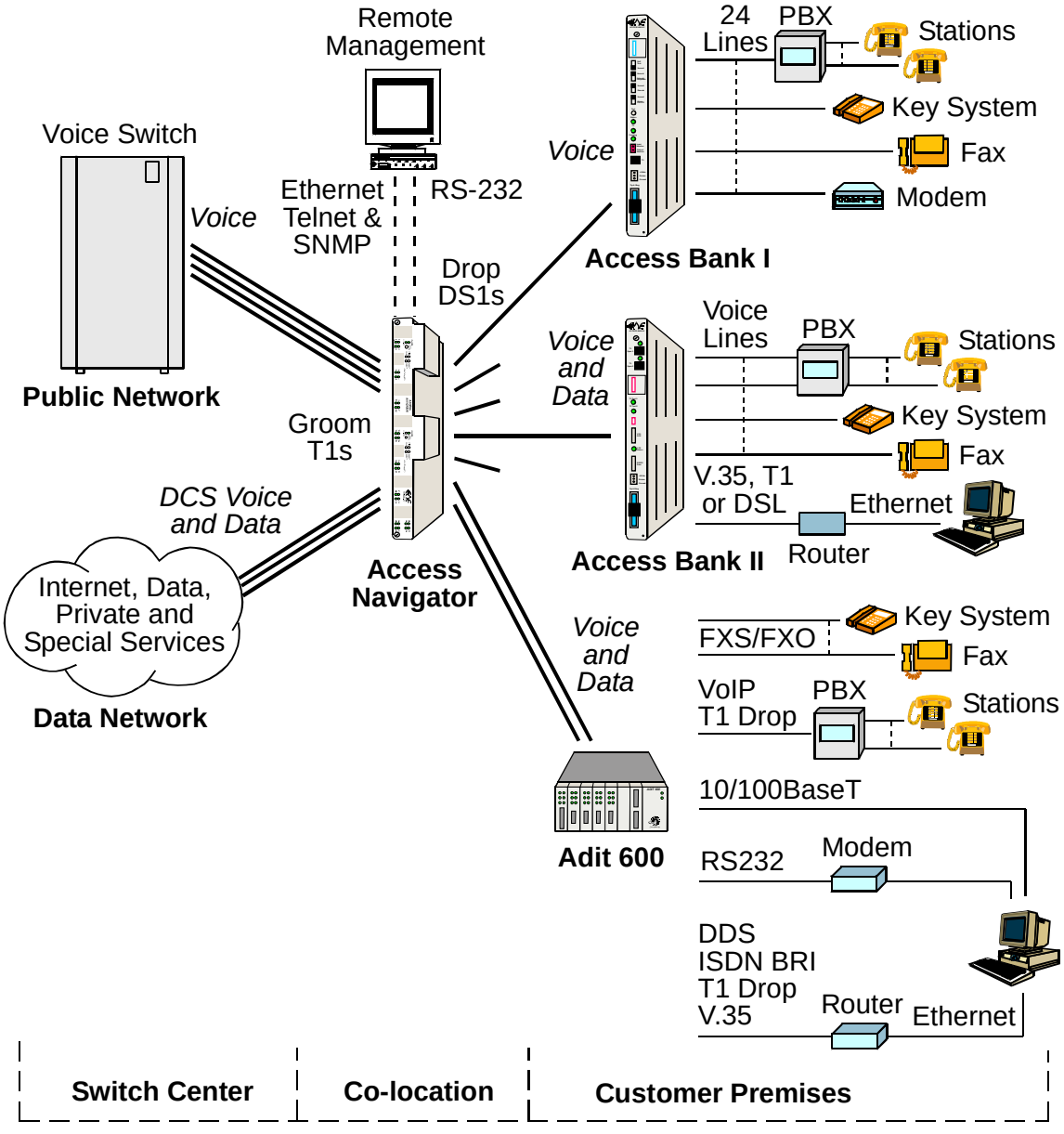

Figure 4-5. Access Navigator Data Host Architecture

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Management Architecture

Access Navigators provide management access via Ethernet SNMP, Telnet CLI, and RS-232 CLI. Valet™ and NetworkValet™ EMS software provides a graphical user interface (GUI) for SNMP management. Flow-through provisioning of the remote Access Bank II and testing control over T1 connections reduce truck rolls and monitors voice and data service availability at customer locations.

IP DS0 Management

The Access Navigator can use IP management commands and dedicated DS0s to manage up to 24 remote Adit 600 terminals. (Up to 14 of the remote Adit 600s may have P-Phone cards.) IP DS0 management uses a colocated Adit 600 terminal with an IP Router card to redirect IP messages between the Access Navigator's IP port and the 24 DS0s on a groom DS1. The Access Navigator then cross-connects the groom DS0s to a dedicated drop DS0 going to each remote Adit 600. Customers wishing to conserve IP addresses can use an Ethernet hub or router providing port addresses translation (NAT) to isolate the IP DS0 management network.

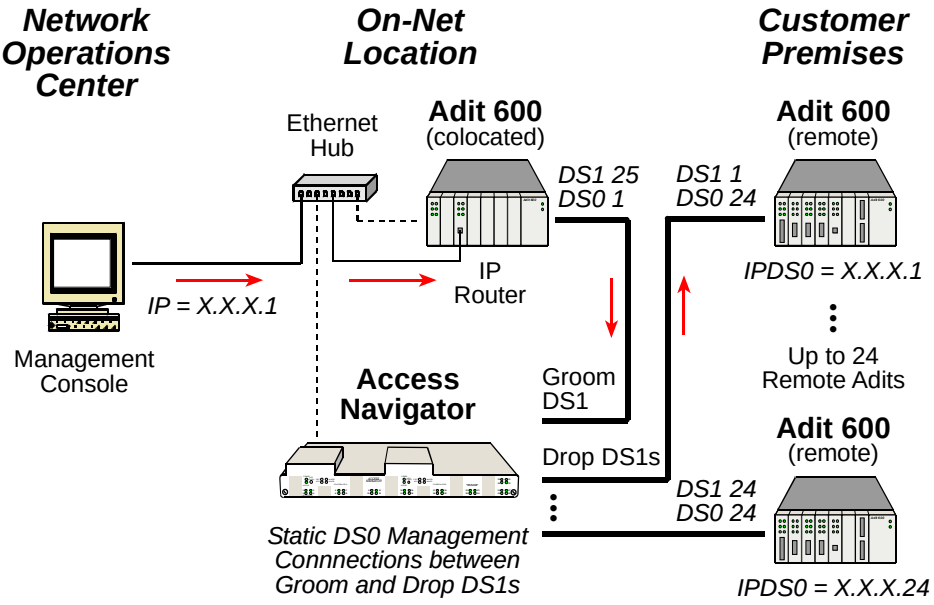

Figure 4-6. Access Navigator IP DS0 Management Architecture

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FDL Management

When T1 Type I lines are available, the Access Navigator can use the ESF Faciltiy Data Link to manage remote Access Bank II and Adit 600 terminals. (FDL can not be used to manage remote Adit 600s with P-Phone cards.)

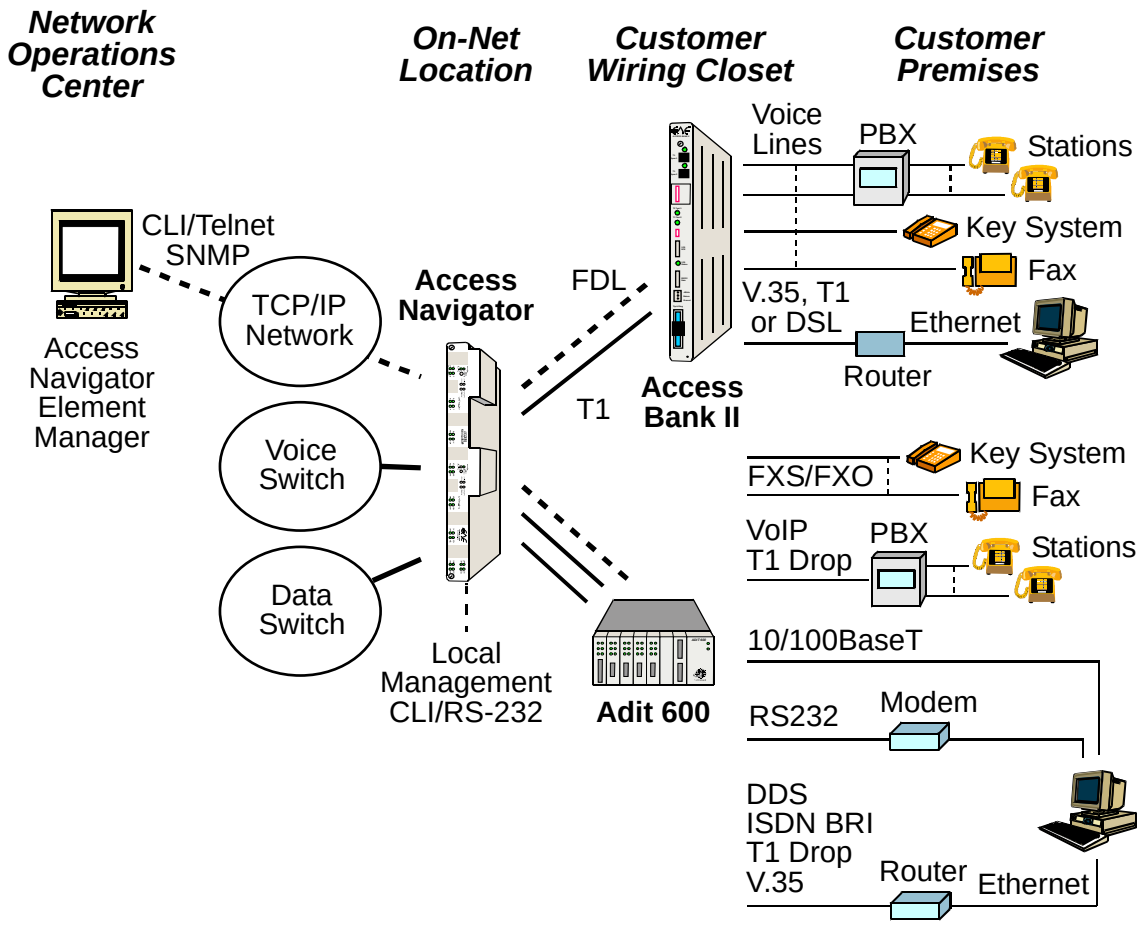

Figure 4-7. Access Navigator FDL Management Architecture

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Configuration

The Access Navigator / GR-303 Host with P-Phone combines call processing and concentration capabilities of a GR-303 digital loop carrier (DLC) system with the functionality of a miniature 1/0 digital crossconnect switch (DCS). Providing up to 32 DS1 ports (768 DS0s) in one small package, the Access Navigator fits easily into small collocation spaces and phone closets.

- Hardware configuration: Modular construction with plug-in cards includes built-in circuit and network testing and fuse-less protection (see Figure 4)
- Software configuration: Operating system is stored in upgradeable flash memory. Configuration and provisioning data are stored in nonvolatile RAM, protected from power interruptions.

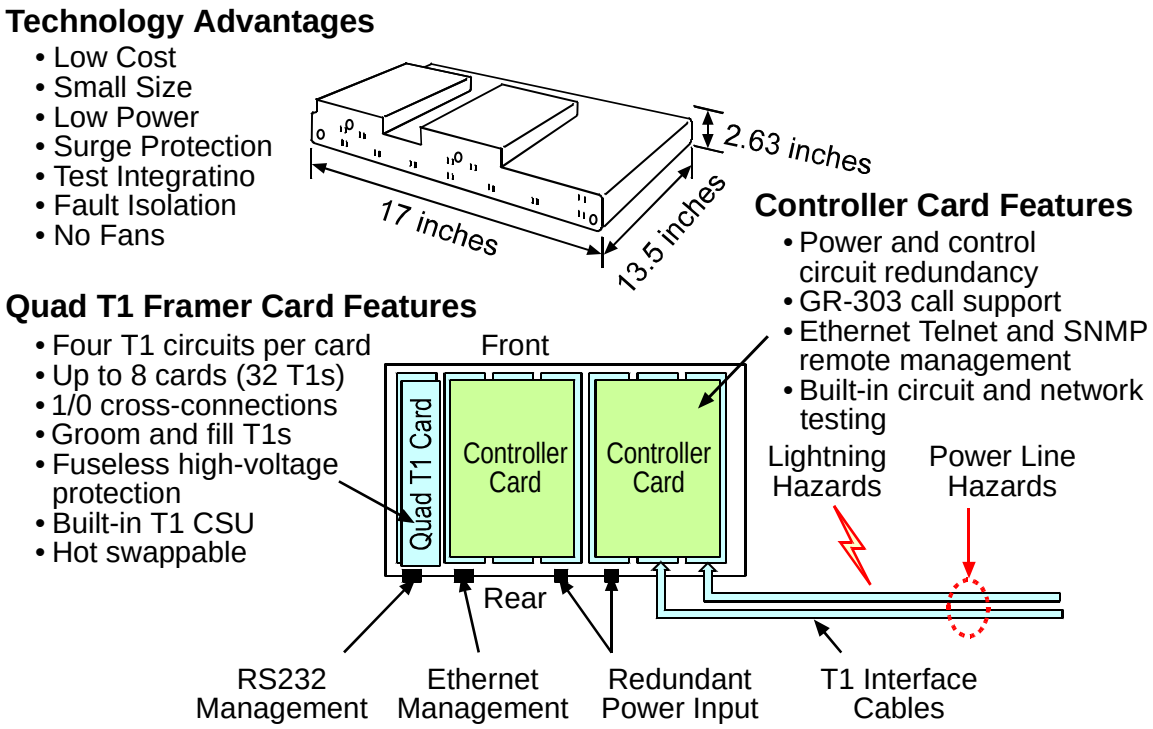

Figure 4-8. Access Navigator Hardware Configuration

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Applications

- T1 Service POP-In-A-Box: Customer-located T1 access management for carriers
- Call Concentration: Variable concentration of voice and P-Phone calls for more efficient use of backhaul T1s and switch resources
- End-Office T1 Grooming: T1 access consolidation, provisioning, protection, and service management
- Host Control of Access Bank II: Flow-through remote management and bandwidth grooming of Access Bank IIs

Interfaces

- DS1 Interface: Two Champ® 64-pin connectors with 32 DS1 circuits, one for receive (input) and one for transmit (output)
- RJ45C Interface: Timing input connector for external clock source (such as BITS)
- RS-232 Interface: DB9 (DE9) connector for CLI management by craft terminal or computer with terminal emulation software
- Ethernet Interface: 10Base-T connector for SNMP and Telnet CLI management

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Specifications

GR-303 Operation

- Up to 32 T1s per system
- Primary and redundant protection for EOC and TMC
- GR-303 to TR-08 translation for CA's Access Bank I/TR-08
- GR-303 Direct Inward Dial (DID) support for Lucent 5ESS switches
- GR-303 line concentration of 4:1 TDM ISDN BRI services
- GR-303 line concentration of Nortel P-Phone (EBS) services from CA's Adit 600 terminals (up to 384 P-Phone channels from up to 14 remote Adit 600 terminals)
- Alarm and maintenance support for DS1 terminations
- Compatible with Lucent, Nortel, and Siemens switches
- Configurable concentration ratios
- Programmable call reference values (CRVs)
- Redundancy, 1:1 controller & power conversion

Crossconnects

- DCS 1/0 interface supports crossconnects at DS0 level
- Crossconnects up to 24 contiguous DS0s between T1s with one command

DS1 Interface

- Four T1s per line card, hot swappable
- Line rate: 1.544 Mb/s ± 32ppm
- Line code: B8ZS or AMI
- Framing: D4 (SF) or ESF
- DS1 receive sensitivity: –28dB to +1.5dB
- Line build-outs:
  DSX-1 (0 to 660 ft. in 5 steps)
  CSU (0 dB, –7.5 dB, –15 dB, –22.5dB)
- ANSI T1.403, Section 6 & 7 (jitter, pulse mask transmission, receive sensitivity, framing formats)
- Built-in CSU with loopback and BERT for testing the T1s

System Clocking

- Primary and secondary sources from: DS1s, external clock source (such as BITS) or internal clock (minimum Stratum 4)
- Automatic clock switching and holdover

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GR-303 Signaling

- GR-303 ABCD robbed-bit signal codes
- GR-303 Direct Inward Dial (DID) signaling for Lucent switches
- GR-303 4:1 TDM mode support for ISDN BRI
- GR-303 P-Phone (EBS) signaling for Nortel switches
- FXS loop start and ground start

DCS Signaling

- Robbed-bit and clear channel connections at DS0 level
- FXS/FXO loop start and ground start
- E&M robbed bit signaling

Management Interfaces

- Command line interface (CLI) for provisioning and maintenance
- RS-232 interface for local CLI
- Ethernet Telnet support for remote CLI
- Ethernet SNMP uses Telcordia® standard MIB for DS1 interfaces (RFC-1406)
- TFTP and Xmodem support for flash memory software upgrades

Protocols

- Command Line Interface (CLI)
- Simple Network Management Protocol (SNMP)
- Telcordia® GR-303
- Nortel NIS V202-1, Issue 01 (P-Phone)
- Telnet
- TFTP and Xmodem support for flash memory software upgrades

Alarms

- Critical, Major, and Minor alarm levels
- DS1 alarms for LOS, LOF, AIS, and RAI
- Front panel LED indicators
- Output signal: relay contact closure and LED indication
  Maximum relay contact rating: 110V AC or DC @ 1A
- Alarm inputs from dry contact closures
  Maximum input rating: 60V DC

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Compliance

USA

- UL 1950, 3rd Edition
- FCC Part 15, Class A
- FCC Part 68
- NEBS Level 3 for Type 2 and 4 equipment
  GR-1089-CORE
  GR-63-CORE

CANADA

- CSA C22.2 No. 950.95
- ICES-003, Class A
- CS-03

Standards

- AT&T 62411 (Stratum 4 enhanced T1 CPE)
- ANSI T1.403 and T1.107a

Power

- Input power: –42 to –60 VDC @ 1.5A
- Dual feed DC power input terminals
- Power dissipation: 65 watts (225 Btu/hr.), fully equipped
- Solid-state (fuse-less) over-voltage and over-current protection

Environmental

- Operating temperature: –5°C to +45°C (23°F to 113°F), up to +55°C short term (NEBS)
- Solid-state over-temperature protection
- Relative humidity: 0 to 95%, non-condensing
- No fans; Passive thermal management

Physical

- Dimensions: 17" x 13.5" x 2.63"
- Weight: 10 lbs. (4.54 kg)
- Mounts in 19 and 23 inch racks
- Optional wall mount brackets

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Compliance Requirements

FCC Requirements

This equipment complies with Part 15 and Part 68 of the Federal Communications Commission (FCC) Rules.

Part 15, Class A

This equipment has been tested and found to comply with the limits for a Class A digital device in accordance with Part 15 of the FCC Rules. These limits provide reasonable protection against harmful interference when equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions in this manual may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

The following cables, when connected to this equipment, must be shielded to maintain FCC Part 15 compliance:

- Both DSX-1 cables
- RS-232 cable

Part 68

This equipment complies with Part 68 of the Federal Communications Commission rules. The silkscreen on the top cover of this equipment includes the FCC registration number.

You must supply the following information to the telephone company, if they request it.

- FCC Registration Number: 2Z6USA-33482-DD-N
- Service Center in the USA:

Carrier Access Corporation
5395 Pearl Parkway
Boulder CO 80301-2490
Phone 800-495-5455

If this equipment has been found to cause harm to the telephone network, the telephone company will notify you in advance. If advance notice proves impractical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe such action is necessary.

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of your equipment. If this happens, the telephone company will

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provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you need to make repairs or modifications to the equipment, please first contact Carrier Access Corporation for repair, modification, and warranty information. Customer repairs and modifications are limited to the replacement of circuit boards; any other repairs or modifications will void your warranty.

Facility Interface Codes (FIC)

FIC CODES	DESCRIPTION
04DU9-BN	1.544 Mbps Superframe Format (SF) without Line Power
04DU9-DN	1.544 Mbps Superframe (SF) and B8ZS without Line Power
04DU9-1KN	1.544 Mbps ANSI, ESF without Line Power
04DU9-1SN	1.544 Mbps ANSI, ESF, and B8ZS without Line Power

Service Order Codes (SOC)

SOC CODES	DESCRIPTION
6.0F	Combinations of equipment provide full protection to digital services. Billing protection and encoded analog protection are provided either by including auxiliary equipment within the registration envelope or by use of a separately registered device.

Telcordia (Bellcore) Requirements

This equipment conforms with Telcordia® standard GR-1089-CORE, New Equipment Building System (NEBS), requirements for intra-building (inside plant) Type 2 and Type 4.

To maintain compliance with the GR-1089-CORE requirements to prevent EMI/EMC radio frequency interference with other equipment, the DSX-1 and RS-232 cables must be shielded and have ferrite bead RFI suppressors.

UL Requirements

This equipment conforms with Underwriters Laboratory standard UL 1950 (supersedes UL 1459). To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

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CSA Requirements

This telecommunication network equipment conforms with Canadian Standards Association (CSA) standard C22.2 No. 950.95. To maintain this compliance, all access covers must be replaced after servicing the equipment to prevent fires from spreading to nearby equipment.

Ordering Information

Part Number	Item	Description
930-1026	AN/GR-303 P-Phone	Access Navigator GR-303 Host with P-Phone, 32 T1 Redundant Package: 2 AN-GR-303 Controller Cards 8 AN-Quad T1 Framer Cards
930-0200	AN-Case	Access Navigator redundant NEBS chassis and backplane. Chassis holds two Controller cards and eight Quad T1 Framer cards (32 T1 circuits). Order cards separately.
740-0216	AN-GR-303 P-Phone Controller Card	Access Navigator Controller card with GR-303, P-Phone, and DCS software.
740-0018	Quad T1 Framer Card	Access Navigator Quad T1 Framer card terminates 4 T1 interfaces from switch, customer site, or data network.
005-0025	DSX-1 Cable	64-pin DSX-1 cable, 10 feet long, male/male. Two cables must be ordered per Access Navigator, one TX, one RX. May be used for DS1 and DSX-1 transmission levels.
005-0030	DSX-1 Cable	64-pin DSX-1 cable, 25 feet long (see 005-0025).
710-0153	19”/23” Universal Mounting Brackets	Universal mounting brackets and screws for 19 and 23 inch equipment racks. This bracket set is included with all Access Navigator unit purchases.
710-0003	19” Vertical Mount Crossbars	Two heavy-duty 19 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
710-0004	23” Vertical Mount Crossbars	Two heavy-duty 23 inch horizontal crossbars mount in equipment rack and enable vertical installation of up to 6 Access Navigator and Wide Bank 28 products.
770-0079	AN-Manual	Access Navigator User Manual is included with all Access Navigator unit purchases.

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CHAPTER 5

Physical Installation

In this Chapter

- Compliance and Safety Requirements ... 5-2
- Tools and Materials ... 5-3
- Unpacking and Inspection ... 5-3
- Horizontal 19-Inch Rack Mount ... 5-4
- Horizontal 23-Inch Rack Mount ... 5-7
- Vertical Rack Mount Using Crossbars ... 5-11
- Vertical Wall Mount ... 5-15

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Compliance and Safety Requirements

DANGER! **FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.**

CAUTION! **NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15 COMPLIANCE REQUIRES CHASSIS GROUNDING, SHIELDED DSX-1 AND RS-232 CABLES WITH FERRITE RF SUPPRESSOR BEADS, AND SHIELDED ETHERNET AND BITS CLOCK CABLES TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.**

WARNING! **NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

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Tools and Materials

Physical installation requires the following tools and materials.

- Screwdrivers, Phillips #2 and #3
- Screwdrivers, slotted
- Screws (4 ea.), 12-24 × 1/2 inch (for 23 inch rack only)
- Screws (8 ea.), #8 × 3/4 inch panhead (for wall mount only)
- Universal rack mounting kit, PN 710-0153 (one additional kit required for wall mount only)
- Plywood and fasteners (for wall mount only, see *Vertical Wall Mount* on page 5-15)

NOTE: ABAM shielded cable is recommended for extending DSX-1 connections.

Unpacking and Inspection

1. Inspect containers for damage during shipment. Report any damage to the freight carrier for possible insurance claims.

NOTE: Check packing list (taped to outside of container) before opening container. Packing list should agree with label on outside of Access Navigator shipping container. Packing lists show only top level part numbers.

2. Compare packing list with office records. Report any discrepancies to the office.
3. Open shipping containers. Be careful not to damage contents.

WARNING! DO NOT OPEN EQUIPMENT COVERS OR ANTI-STATIC PLASTIC BAGS UNTIL READY FOR INSTALLATION. ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.

4. Inspect contents of shipping containers for any damage that may have occurred during shipment. Report any damage to the freight carrier for possible insurance claims.
5. If equipment must be returned to for any reason, carefully repack equipment in original shipping container with original packing materials if possible. See *Warranty* and *Warranty Product Returns* in the Preface of this manual.
6. If equipment is to be installed later, replace equipment in original shipping containers and store temporarily in a safe place until ready to install equipment.

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Horizontal 19-Inch Rack Mount

Installation Summary

- Precautions ... 5-4
- Tools and Materials ... 5-4
- Attach Mounting Brackets to Access Navigator ... 5-5
- Attach Access Navigator to Equipment Rack ... 5-5

Precautions

CAUTION! **ACCESS NAVIGATOR REQUIRES AT LEAST 4.37 INCHES (2.5 RACK UNITS) OF FREE AIR SPACE ABOVE AND BELOW CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN.**

Tools and Materials

Obtain the following tools and materials:

- Screwdrivers, Phillips #2 and #3
- Screwdrivers, slotted
- Universal rack mounting bracket kit, PN 710-0153, included with Access Navigator
- Rack mounting screws (4 ea.), as appropriate for equipment rack

NOTE: Rack mounting brackets come with hardware for installation in both 19-inch and 23-inch equipment racks. Some hardware is not required for 19-inch rack installation.

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Attach Mounting Brackets to Access Navigator

1. Open bag containing universal rack mounting kit and select the following items (see Figure 5-1):
   - Mounting bracket (2 ea.), PN 0040303 (stamped on part)

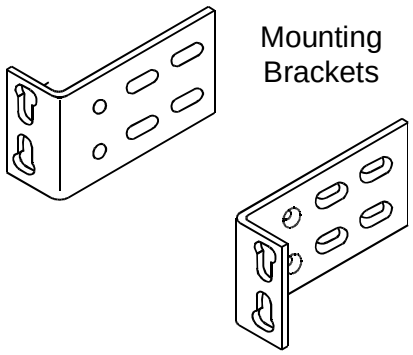

Figure 5-1. Mounting Brackets

2. Position mounting brackets for required flush mount or 5-inch forward offset with respect to front rails of equipment rack (see A in Figure 5-2 on page 5-6).
3. Remove mounting screws (6-32 × 3/8 inch, 82º undercut, Phillips) from sides of Access Navigator where brackets will be attached.
4. Attach mounting brackets to sides of Access Navigator using mounting screws removed in previous step (see B in Figure 5-2).

Attach Access Navigator to Equipment Rack

CAUTION! ACCESS NAVIGATOR REQUIRES AT LEAST 4.37 INCHES (2.5 RACK UNITS) OF FREE AIR SPACE ABOVE AND BELOW CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN.

1. Position Access Navigator in equipment rack slot (refer to office records). Ensure that there is at least 4.37 inches (2.5 rack units) of free air space above and below chassis for cooling (see Figure 5-3 on page 5-6).
2. Secure mounting brackets to equipment rack using appropriate mounting screws (see C in Figure 5-2). Brackets accommodate 1.75 and 2.00 inch hole spacing.

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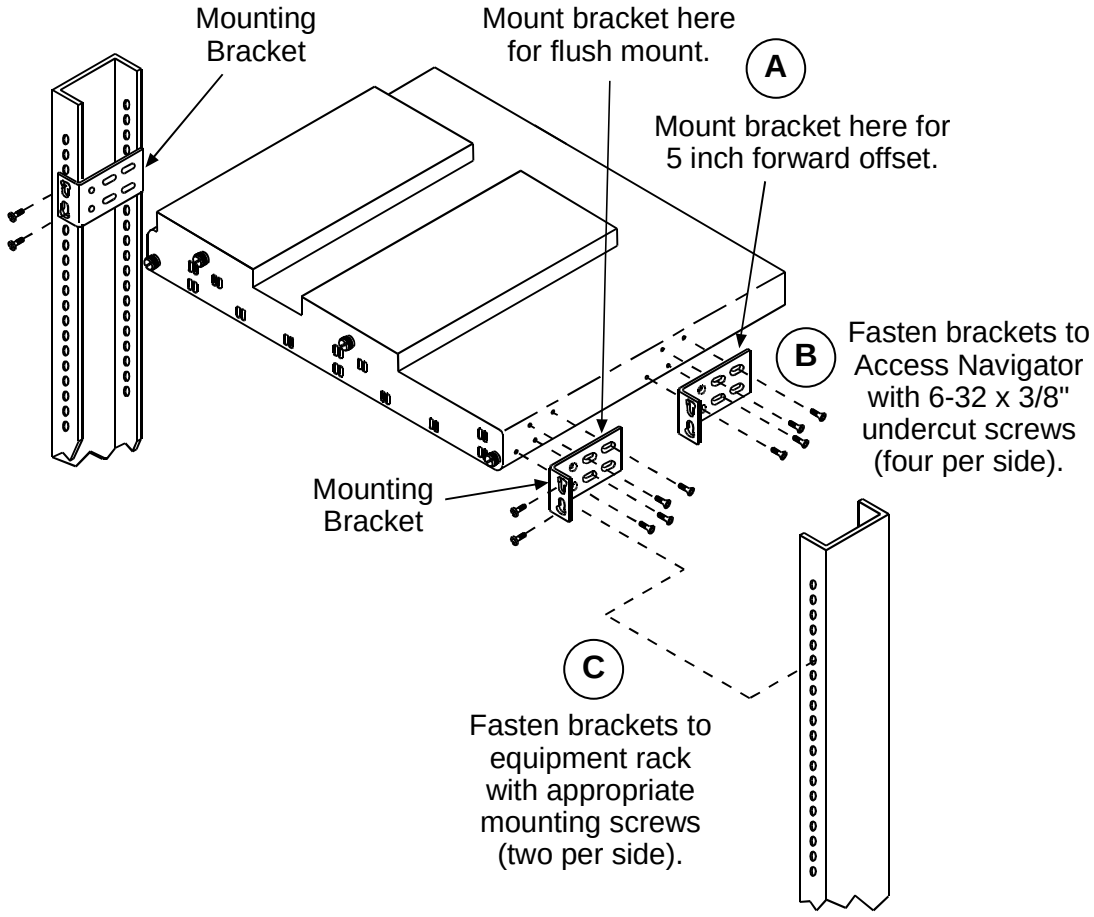
Mounting Bracket
Mount bracket here for flush mount.
A
Mount bracket here for 5 inch forward offset.
B
Fasten brackets to Access Navigator with 6-32 x 3/8" undercut screws (four per side).
Mounting Bracket
C
Fasten brackets to equipment rack with appropriate mounting screws (two per side).

Figure 5-2. Installation in 19-inch Equipment Rack

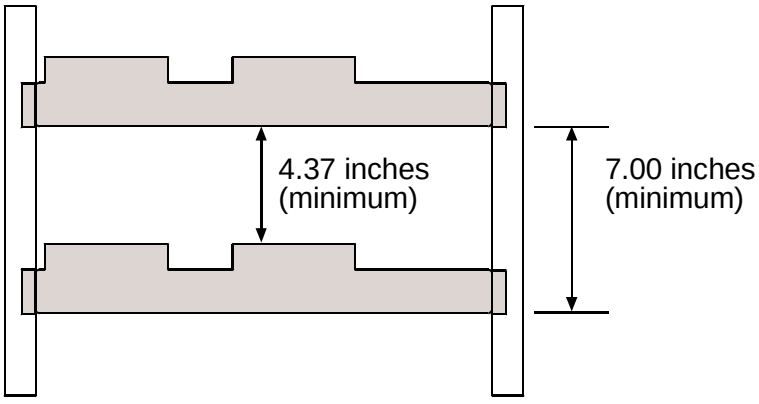

Figure 5-3. Spacing Requirements

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Horizontal 23-Inch Rack Mount

Installation Summary

- Precautions ... 5-7
- Tools and Materials ... 5-7
- Attach Mounting Brackets to Access Navigator ... 5-8
- Attach Access Navigator to Equipment Rack ... 5-9

Precautions

CAUTION! **ACCESS NAVIGATOR REQUIRES AT LEAST 4.37 INCHES (2.5 RACK UNITS) OF FREE AIR SPACE ABOVE AND BELOW CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN.**

Tools and Materials

Obtain the following tools and materials:

- Phillips screw drivers, #2 and #3
- Universal rack mounting bracket kit, PN 710-0153, included with Access Navigator
- Rack mounting screws (4 ea.), as appropriate for equipment rack

NOTE: Rack mounting brackets come with hardware for installation in both 19-inch and 23-inch equipment racks. Some hardware is not required for 19-inch rack installation.

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Attach Mounting Brackets to Access Navigator

1. Open bag containing universal rack mounting kit. It should contain the following items (see Figure 5-4):
   - Mounting bracket (2 ea.), PN 0040303 (stamped on part)
   - Bracket extender (2 ea.), PN 0040310 (stamped on part)
   - Mounting screw (4 ea.), 12-24 × 5/8 inch

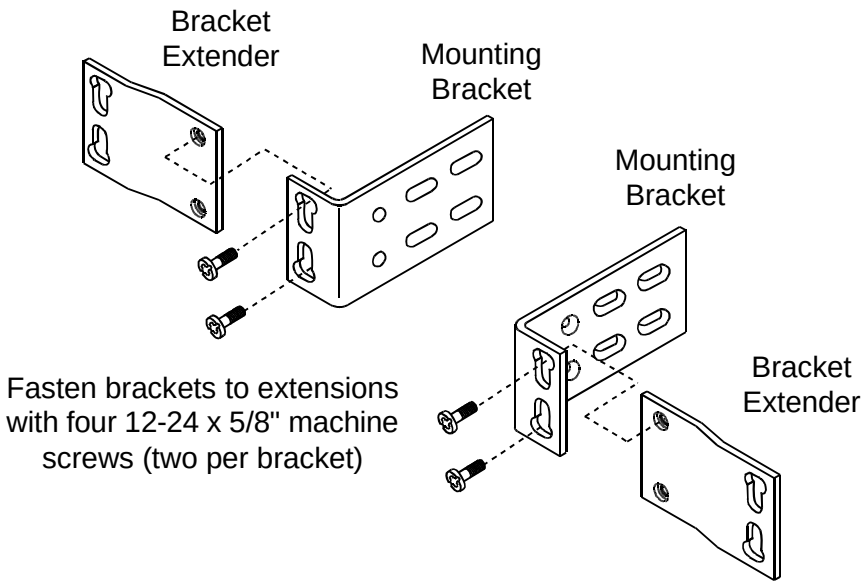
Bracket Extender
Mounting Bracket
Mounting Bracket
Bracket Extender
Fasten brackets to extensions with four 12-24 x 5/8" machine screws (two per bracket)

Figure 5-4. Assemble Mounting Brackets

2. Assemble mounting brackets for 23-inch racks (see Figure 5-4).
   - Attach each mounting bracket to a bracket extender with two 12-24 × 5/8 inch screws.
3. Position mounting brackets for required flush mount or 5-inch forward offset with respect to front rails of equipment rack (see A in Figure 5-5).
4. Remove four mounting screws (6-32 × 3/8 inch, 82º undercut, Phillips) from each side of Access Navigator where brackets will be attached.
5. Attach mounting brackets to each side of Access Navigator using the mounting screws removed in previous step (see B in Figure 5-5).

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Attach Access Navigator to Equipment Rack

CAUTION! **ACCESS NAVIGATOR REQUIRES AT LEAST 4.37 INCHES (2.5 RACK UNITS) OF FREE AIR SPACE ABOVE AND BELOW CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN.**

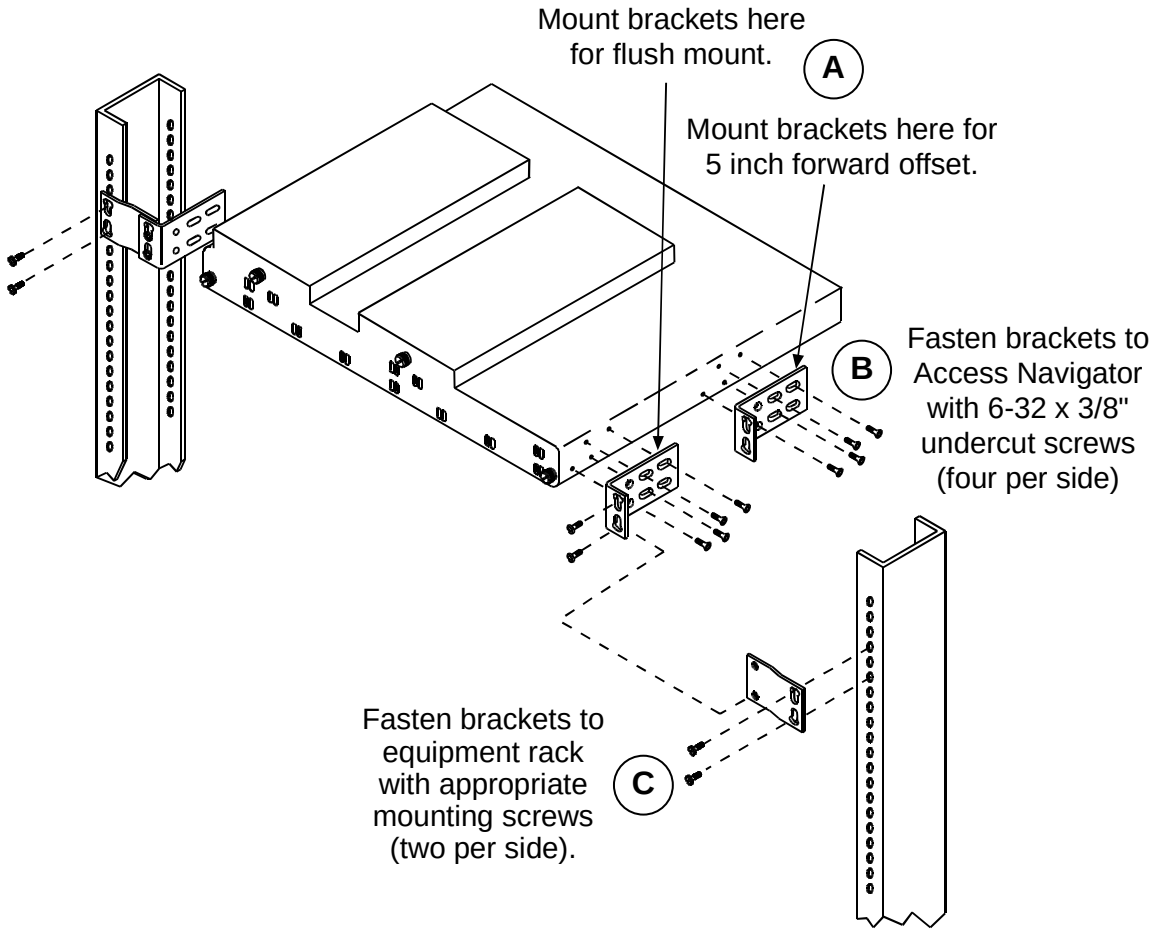
Mount brackets here for flush mount.
A
Mount brackets here for 5 inch forward offset.
B
Fasten brackets to Access Navigator with 6-32 x 3/8" undercut screws (four per side)
Fasten brackets to equipment rack with appropriate mounting screws (two per side).
C

Figure 5-5. Installation in 23-inch Equipment Rack

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1. Access Navigator requires at least 4.37 inches (2.5 rack units) of free air space above and below chassis for air circulation. Insufficient spacing may cause service interruptions, resulting from equipment overheating and shutting down.
2. Position Access Navigator in equipment rack slot (refer to office records). Ensure that there is at least 4.37 inches (2.5 rack units) of free air space above and below chassis for cooling (see Figure 5-6 on page 5-10).
3. Secure mounting brackets to equipment rack using appropriate mounting screws (see C in Figure 5-5). Brackets accommodate 1.75 and 2.00 inch hole spacing.

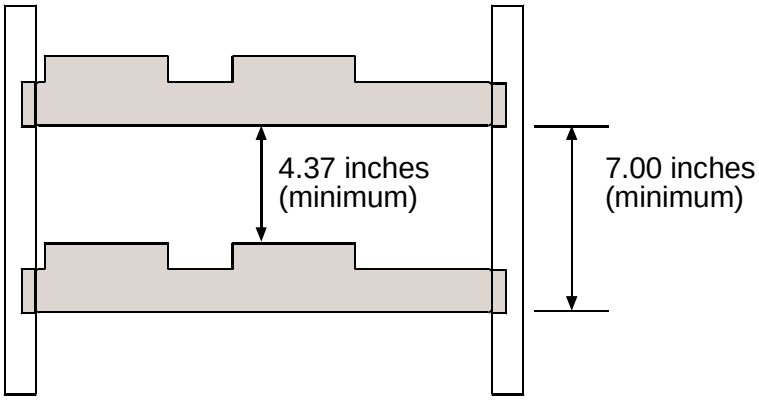

Figure 5-6. Spacing Requirements

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Vertical Rack Mount Using Crossbars

Installation Summary

- Precautions ... 5-11
- Tools and Materials ... 5-11
- Install Crossbars ... 5-12
- Attach Mounting Brackets to Access Navigator ... 5-12
- Attach Access Navigator to Crossbars ... 5-12

Precautions

CAUTION! NEBS THERMAL RESTRICTION – DO NOT INSTALL MORE THAN THREE ROWS OF ACCESS NAVIGATORS PER EQUIPMENT RACK.

CAUTION! ACCESS NAVIGATOR REQUIRES AT LEAST 0.75 INCH OF FREE AIR SPACE ON LEFT AND RIGHT SIDE OF CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN. IF INSTALLING MORE THAN ONE ROW OF UNITS, ENSURE THAT UNITS ARE MOUNTED DIRECTLY ABOVE OR BELOW UNITS IN OTHER ROWS TO MAINTAIN UNOBSTRUCTED VERTICAL AIR CIRCULATION.

Tools and Materials

Obtain the following tools and materials:

- Phillips screw drivers, #2 and #3
- Vertical Mount Crossbars (2 per kit), PN 710-0003 for 19-inch racks or PN 710-0004 for 23-inch racks.
- Universal rack mounting kit, PN 710-0153, included with Access Navigator
- Rack mounting screws (4 ea.), as appropriate for equipment rack

NOTE: Crossbars are sold in pairs. Two 19-inch crossbars mount in 19-inch equipment rack and hold up to five Access Navigator or Wide Bank 28 units. Two 23-inch crossbars mount in 23-inch equipment rack and hold up to six units. One additional crossbar is needed for each additional row of units.

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Install Crossbars

1. Position Vertical Mount Crossbars (refer to office records) so that inside mounting holes are 18.375 inches apart (see A in Figure 5-7 on page 5-13).
2. Attach crossbars to equipment rack with appropriate mounting screws (see B in Figure 5-7).

Attach Mounting Brackets to Access Navigator

NOTE: Universal rack mounting bracket kit includes hardware that is not required for installation using crossbars.

1. Open bag containing the universal rack mounting kit and select the following items (see A in Figure 5-8 on page 5-14):
   - Mounting brackets (2 ea.), PN 0040303 (stamped on part)
   - Mounting screws (4 ea.), 12-24 × 5/8inch, for attaching brackets to crossbars
2. Position mounting brackets for required flush mount or 5-inch forward offset with respect to front rails of equipment rack (see B in Figure 5-8).
3. Remove four mounting screws (6-32 × 3/8 inch, 82º undercut, Phillips) from each side of Access Navigator where brackets will be attached.
4. Attach mounting brackets to each side of Access Navigator using the mounting screws removed in previous step (see C in Figure 5-8).

Attach Access Navigator to Crossbars

CAUTION! ACCESS NAVIGATOR REQUIRES AT LEAST 0.75 INCH OF FREE AIR SPACE ON LEFT AND RIGHT SIDE OF CHASSIS FOR AIR CIRCULATION. INSUFFICIENT SPACING MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN. IF INSTALLING MORE THAN ONE ROW OF UNITS, ENSURE THAT UNITS ARE MOUNTED DIRECTLY ABOVE OR BELOW UNITS IN OTHER ROWS TO MAINTAIN UNOBSTRUCTED VERTICAL AIR CIRCULATION.

1. Position Access Navigator vertically in crossbar slot (refer to office records) with 1.75 inch minimum bracket spacing (3 holes) between other brackets in row (see Figure 5-9 on page 5-14).
2. Secure mounting brackets to crossbar using 12-24 × 5/8inch mounting screws (see D in Figure 5-8 on page 5-14).

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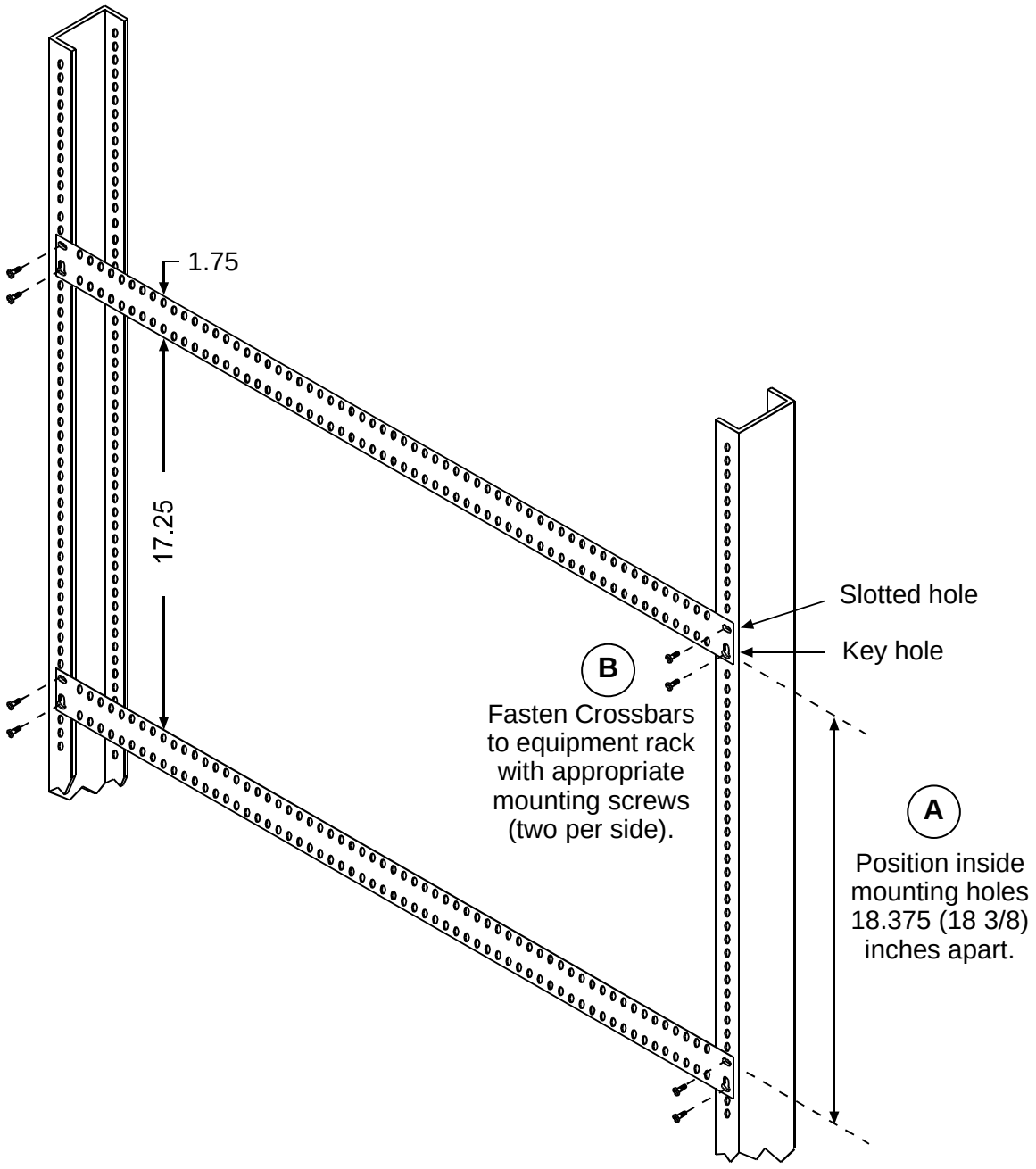

Figure 5-7. Crossbar Installation

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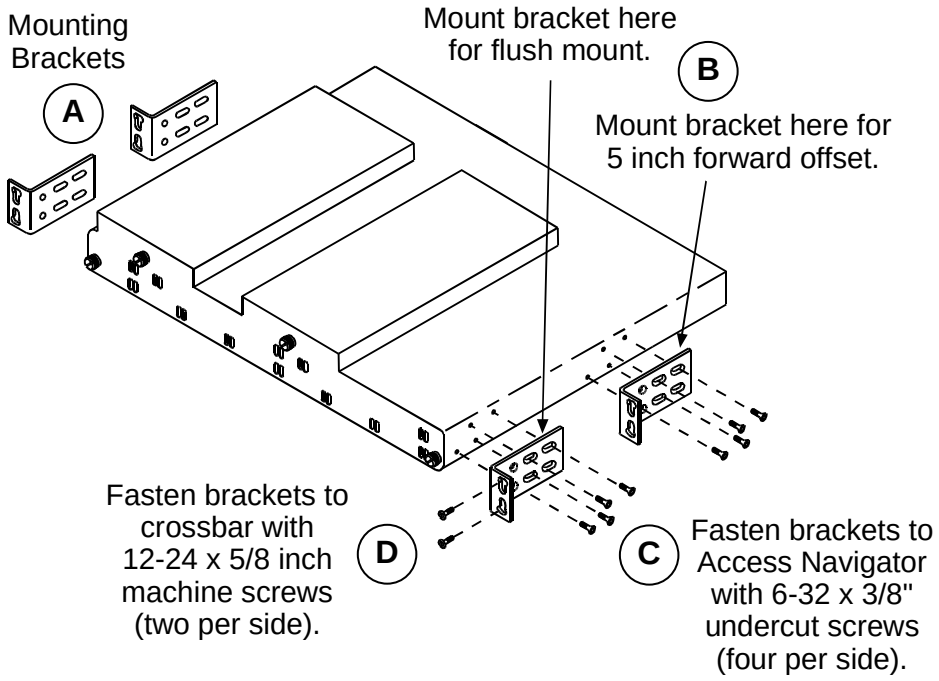

Figure 5-8. Bracket Installation

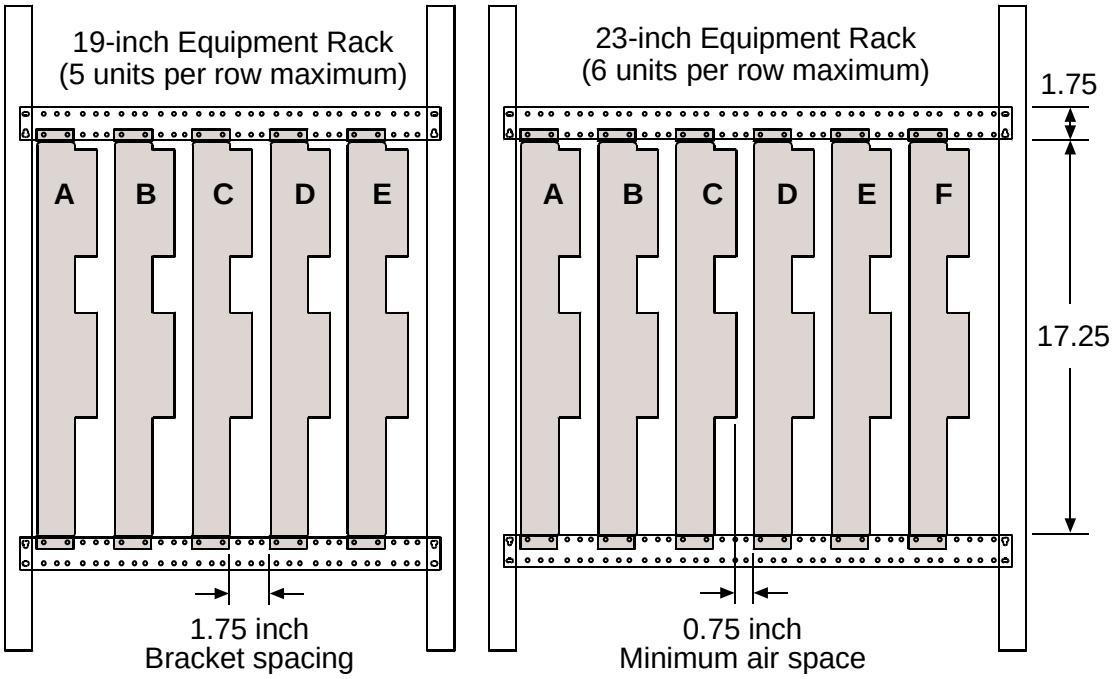

Figure 5-9. Spacing Requirements

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Vertical Wall Mount

NOTE: The following procedure assumes that the Access Navigator and other components will be mounted on a plywood sheet before attaching plywood to wall. Pre-mounting equipment at the carrier facility will speed up installation at the customer site.

Installation Summary

- Precautions ... 5-15
- Tools and Materials ... 5-16
- Ensure Adequate Clearance ... 5-16
- Prepare Plywood ... 5-16
- Attach Mounting Brackets to Access Navigator ... 5-16
- Attach Mounting Brackets to Access Navigator ... 5-16
- Attach Access Navigator to Plywood ... 5-17

Precautions

CAUTION! **WALL MOUNTING IS APPROVED ONLY FOR CUSTOMER PREMISES.**

CAUTION! **ACCESS NAVIGATOR REQUIRES FREE AIR SPACE ON TOP, BOTTOM, AND ENDS OF CHASSIS FOR AIR CIRCULATION. INSUFFICIENT VENTILATION MAY CAUSE SERVICE INTERRUPTIONS, RESULTING FROM EQUIPMENT OVERHEATING AND SHUTTING DOWN. DO NOT ALLOW CABLES AND OTHER COMPONENTS TO OBSTRUCT AIR CIRCULATION. THE ACCESS NAVIGATOR INCLUDES TIE POINTS FOR ATTACHING WIRE TIES TO SECURE CABLES TO REAR PANEL WITHOUT OBSTRUCTING AIR FLOW (SEE FIGURE 5-11).**

WARNING! **IF ACCESS NAVIGATOR IS MOUNTED ON PLYWOOD, DO NOT USE A HAMMER TO ATTACH PLYWOOD TO WALL BECAUSE THE IMPACT SHOCK MAY DAMAGE THE ACCESS NAVIGATOR AND OTHER COMPONENTS MOUNTED ON THE PLYWOOD. A POWER DRILL AND SCREWDRIVER IS RECOMMENDED TO AVOID DAMAGE.**

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Tools and Materials

Obtain the following tools and materials:

- Phillips screw drivers, #2 and #3
- Screws (8 ea.), #8 × 3/4 inch panhead
- Universal mounting kits (2 ea.), PN 710-0153.
  (Access Navigator includes one kit.)
- Plywood, 3/4 inch thick, 10 × 21 inches minimum size

Ensure Adequate Clearance

Ensure there is adequate clearance around Access Navigator to access cards and connectors, and sufficient space for proper ventilation (see Figure 5-10 on page 5-18).

Prepare Plywood

1. Ensure that plywood is large enough to hold the Access Navigator (see Figure 5-11 on page 5-19). Plywood should extend at least 1 inch beyond brackets.
2. Mark mounting hole locations on plywood to ensure that brackets will mount squarely against plywood (see Figure 5-12 on page 5-20).

Attach Mounting Brackets to Access Navigator

NOTE: Universal mounting kit includes hardware that is not required for wall mount installation.

1. Open bags containing the universal mounting kits and select the following items (see A in Figure 5-13 on page 5-21):
   - Mounting brackets (4 ea.), PN 0040303 (stamped on part)
2. Position mounting brackets for wall mounting (see B in Figure 5-13).
3. Remove two mounting screws (6-32 × 3/8 inch, 82º undercut, Phillips) from Access Navigator where each bracket will be attached (see C in Figure 5-13).
4. Attach mounting brackets to each side of Access Navigator using the mounting screws removed in previous step (see C in Figure 5-13). Slide brackets down in screw slots to ensure maximum space beneath Access Navigator for ventilation.

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Attach Access Navigator to Plywood

1. Position Access Navigator with brackets attached over screw hole locations marked in plywood (see Figure 5-12 on page 5-20).
2. Secure mounting brackets to plywood using eight #8 × 3/4 inch panhead screws (see D in Figure 5-13 on page 5-21).

WARNING! **IF ACCESS NAVIGATOR IS MOUNTED ON PLYWOOD, DO NOT USE A HAMMER TO ATTACH PLYWOOD TO WALL BECAUSE THE IMPACT SHOCK MAY DAMAGE THE ACCESS NAVIGATOR AND OTHER COMPONENTS MOUNTED ON THE PLYWOOD. A POWER DRILL AND SCREWDRIVER IS RECOMMENDED TO AVOID DAMAGE.**

3. Attach plywood to wall using fasteners appropriate for heavy objects.

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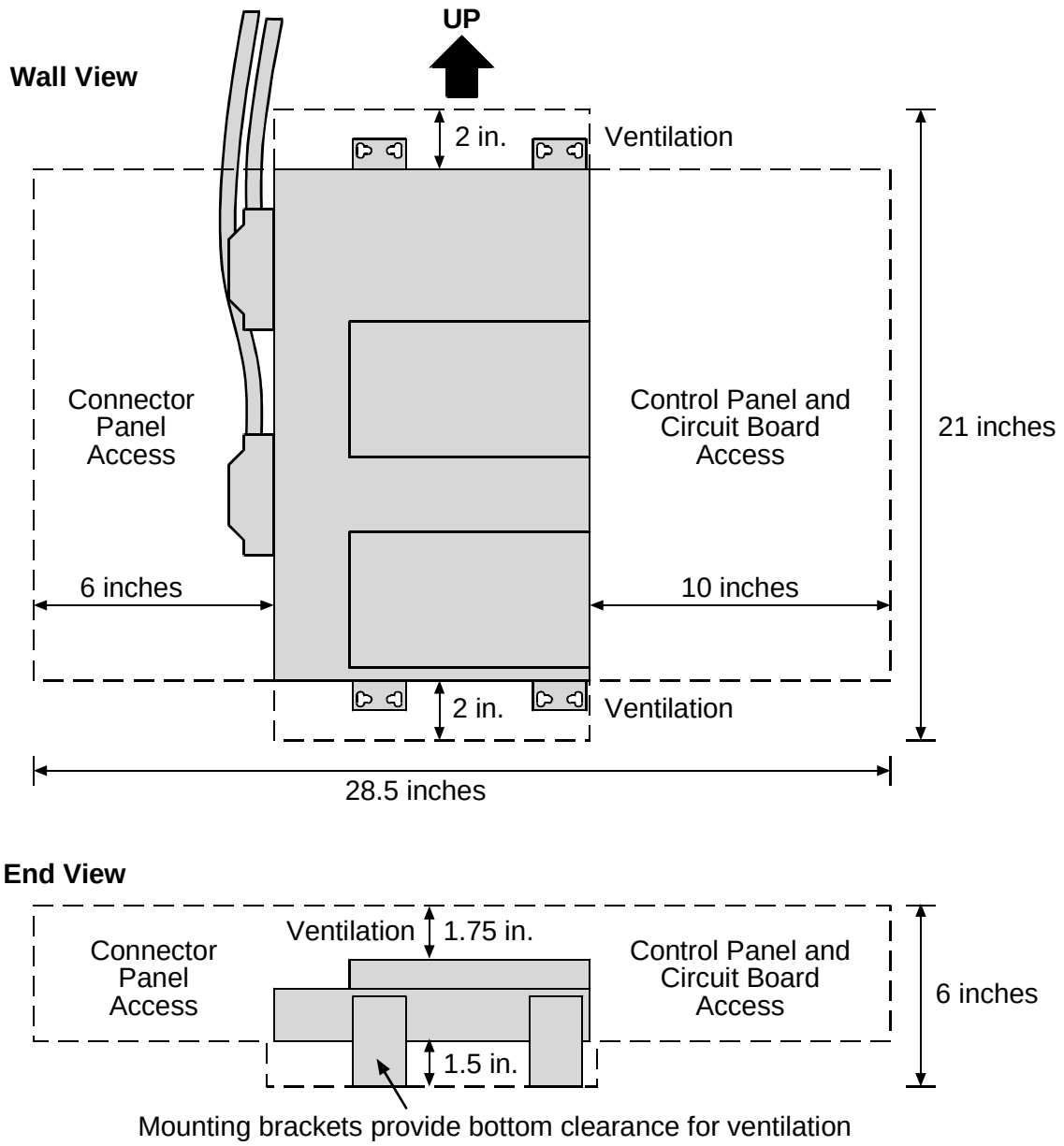

Figure 5-10. Access Clearance Requirements

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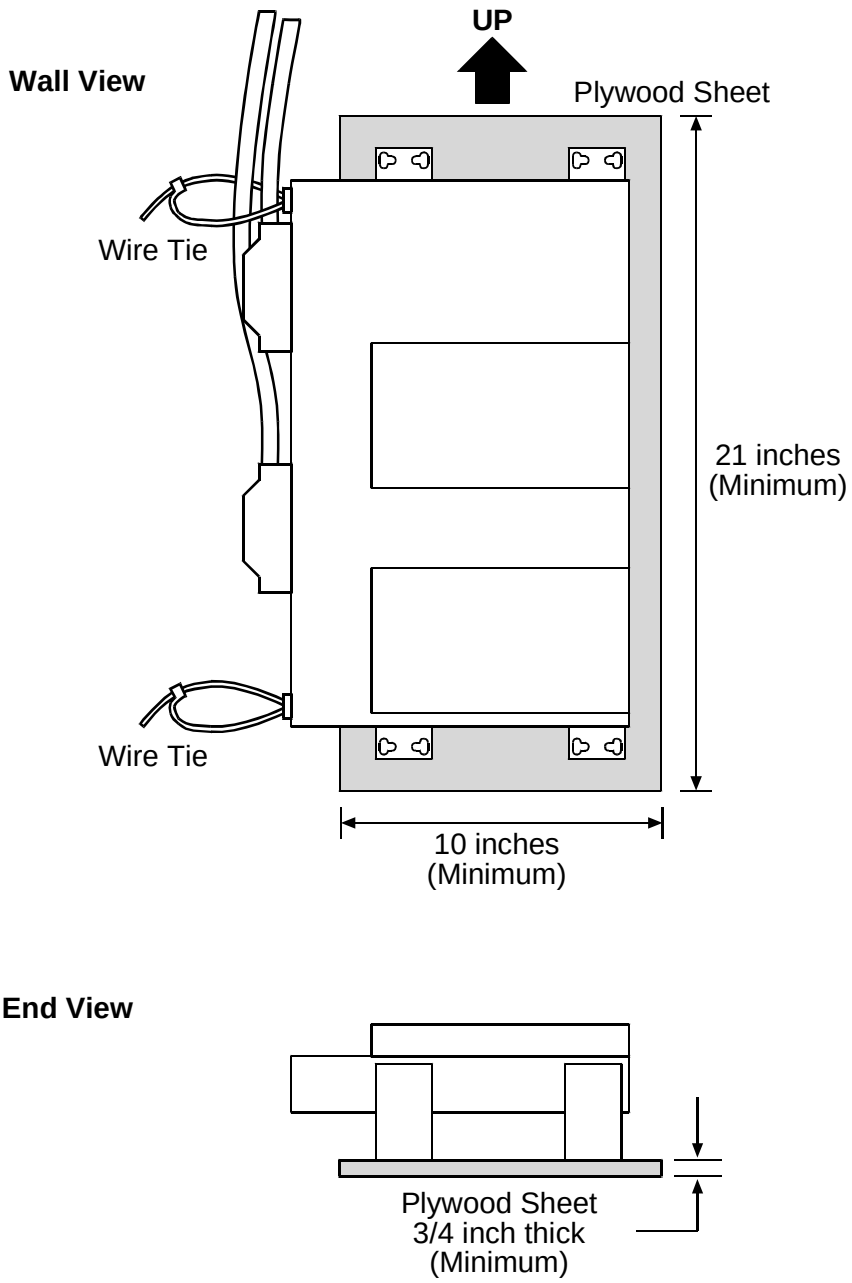

Figure 5-11. Plywood Sheet, Minimum Size

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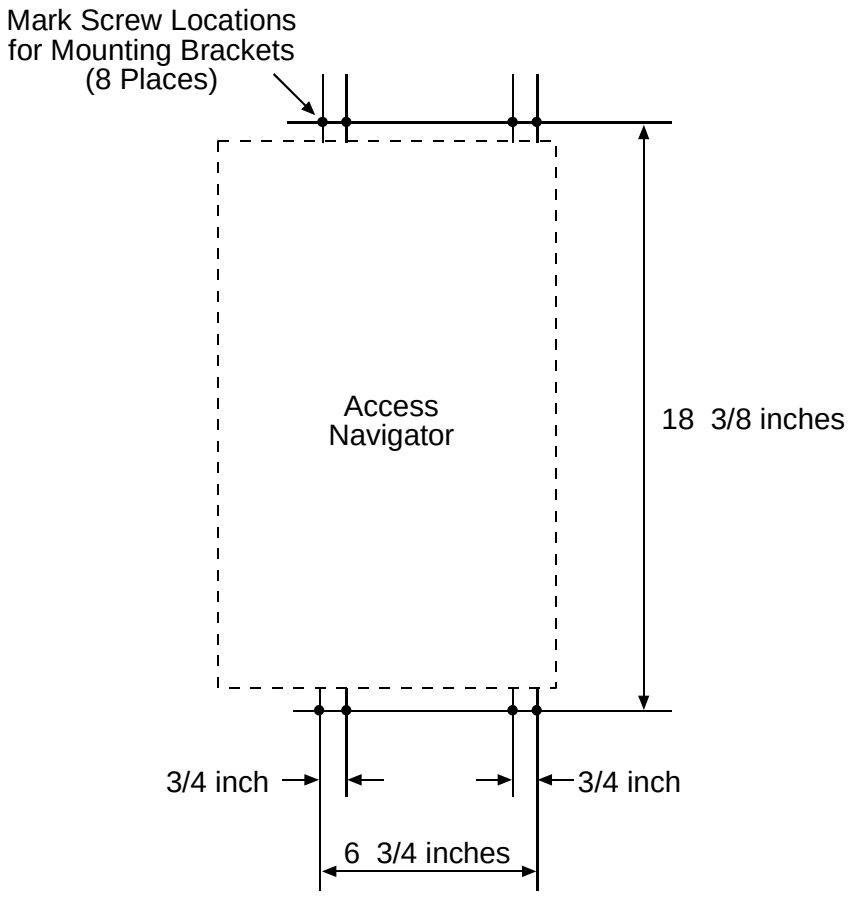

Figure 5-12. Mounting Hole Pattern on Plywood

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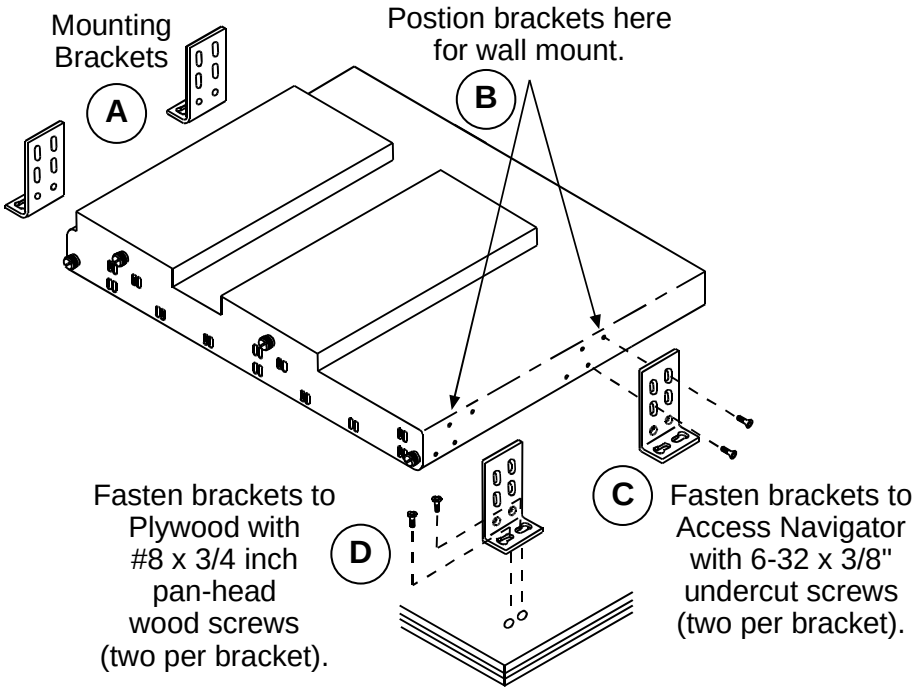
Mounting Brackets
A
Postion brackets here for wall mount.
B
Fasten brackets to Plywood with #8 x 3/4 inch pan-head wood screws (two per bracket).
D
C
Fasten brackets to Access Navigator with 6-32 x 3/8" undercut screws (two per bracket).

Figure 5-13. Wall Mount Bracket Installation

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CHAPTER 6

Electrical Installation

In this Chapter

- Compliance and Safety Requirements ... 6-2
- Static-Sensitive Equipment Handling Procedures ... 6-3
- Tools and Materials Required ... 6-4
- Chassis Ground Connection ... 6-5
- DSX-1 Cable Connections ... 6-8
- RS-232 Management Connection ... 6-17
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- Install Additional Quad T1 Framer Cards ... 6-55
- Configure Management Interfaces ... 6-61

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Compliance and Safety Requirements

DANGER! **FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.**

CAUTION! **NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15 COMPLIANCE REQUIRES CHASSIS GROUNDING, SHIELDED DSX-1 AND RS-232 CABLES WITH FERRITE RF SUPPRESSOR BEADS, AND SHIELDED ETHERNET AND BITS CLOCK CABLES TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.**

WARNING! **NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

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Static-Sensitive Equipment Handling Procedures

WARNING! THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS USE THE FOLLOWING PROCEDURE WHENEVER HANDLING PLUG-IN CIRCUIT CARDS.

ESD can damage processors, circuit boards, and other electronic components. Always observe the following precautions before installing a system component.

The ESD warning label below appears on packages and storage bags that contain static-sensitive products and components.

1. Do not remove a component from its protective packaging until ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

NOTE: A grounding wrist strap consists of an electrically conductive elastic wrist band with a grounding wire for connection to the equipment chassis or a common ground point.

3. To test the grounding wrist strap to ensure that it is working properly:
   - Use ohmmeter to check resistance of grounding wrist strap.
   - Connect one meter lead to wrist strap.
   - Connect other meter lead to metal clip or banana plug at end of grounding wire.
   - A resistance of one to ten megohms (million ohms) is typical and will provide adequate protection to equipment and user.
   - **DO NOT** use the wrist strap if the resistance is more than 35 megohms because it will not protect the equipment from ESD damage.
   - **DO NOT** use the wrist strap if the resistance is less than 0.75 megohms (750,000 ohms) because it will not protect you from high voltage shock hazards.
4. Before touching a circuit card, momentarily touch the grounded equipment rack or chassis to discharge any static buildup.
5. Before inserting or removing a circuit card from a storage bag, momentarily ground or hold the anti-static plastic storage bag to discharge any static buildup.
6. Do not touch any components or printed wiring on the circuit card. Hold the card by its edges or plastic handles.

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7. Always store circuit cards in an anti-static storage bag. Whenever possible, use the same storage bag the card or replacement card came in.
8. If a circuit card is to be returned to the factory, always ship the circuit card inside an anti-static storage bag.

Tools and Materials Required

Electrical installation requires the following tools and materials.

- Screwdrivers, Phillips #2 and #3
- Screwdrivers, slotted
- Pliers, needle nose
- Cutters, diagonal
- Wire stripper, 16-26 AWG
- Wire wrap tool, bits for 22, 24, 26 AWG
- Wire unwrap tool
- Wire ties
- Grounding wrist strap
- Continuity tester
- Volt-ohm meter
- Shielded RS-232 cable: DTE-to-DCE for direct connection to a computer or a DCE-to-DCE (null modem cable) for connection to a modem (see *RS-232 Management Connection* on page 6-17)
- Shielded DSX-1 cables (2 ea.), PN 005-0025 (10 ft.) or 005-0030 (25 ft.), or equivalent

NOTE: ABAM shielded cable is recommended for extending DSX-1 connections.

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Chassis Ground Connection

Installation Summary

- Precautions ... 6-5
- Tools and Materials ... 6-5
- Run Ground Wire to Access Navigator ... 6-6
- Connect Ground Wire to Ground Lug ... 6-6
- Attach Ground Lug to Access Navigator ... 6-7

Precautions

CAUTION! **CHASSIS MUST BE GROUNDED FOR COMPLIANCE WITH NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15, TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.**

WARNING! **SHEET METAL CAN BE DAMAGED BY BENDING GROUND WIRE WHEN GROUND LUG IS ATTACHED TO ACCESS NAVIGATOR. BEFORE ATTACHING GROUND LUG SCREWS, CAREFULLY BEND THE GROUND WIRE TO POSITION THE GROUND LUG OVER THE REAR PANEL TERMINALS.**

Tools and Materials

NOTE: A ground lug with compression terminal is provided for attaching #6 or #8 AWG insulated stranded copper wire. Follow standard practice for building ground systems.

Obtain the following tools and materials:

- Screwdrivers, slotted
- Screwdrivers, Phillips
- Insulated copper wire, #6 or #8 AWG as required
- Wire stripper

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Run Ground Wire to Access Navigator

1. Measure and cut enough insulated copper wire to connect from building ground to Grounding Lug on Access Navigator (see Figure 6-2).

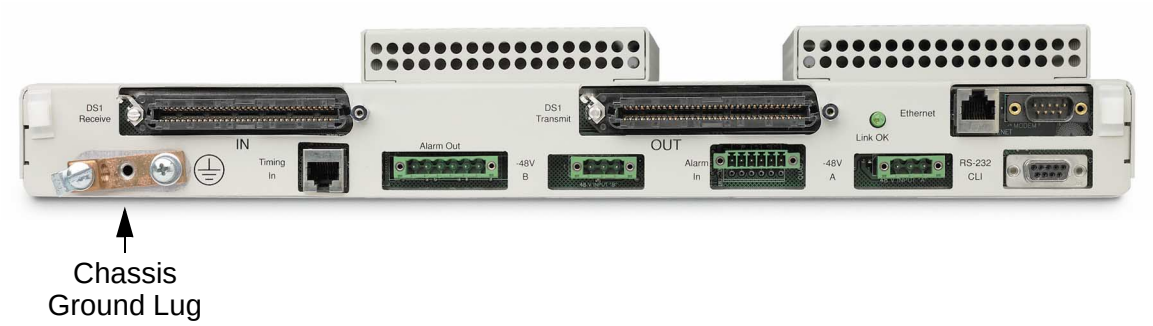

Figure 6-1. Location of Grounding Lug Terminals

2. Route wire from building ground to ground lug on Access Navigator.

Connect Ground Wire to Ground Lug

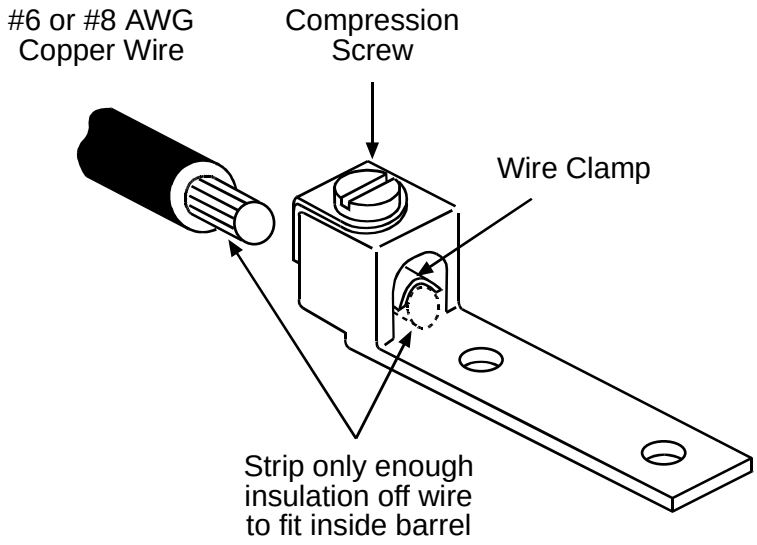

Figure 6-2. Connect Ground Wire to Lug

1. Strip enough insulation off wire end to fit inside lug, flush with front of wire clamp (see Figure 6-2).
2. Route wire from building ground to ground lug on Access Navigator.
3. Bend ground wire so that wire end is positioned over ground lug terminal.
4. Remove ground lug from Access Navigator and set screws aside for later use.
5. Loosen compression screw until opening beneath wire clamp is large enough to accept ground wire.
6. Insert ground wire into lug barrel, beneath compression plate, and tighten compression screw.

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Attach Ground Lug to Access Navigator

WARNING! **SHEET METAL CAN BE DAMAGED BY BENDING GROUND WIRE WHEN GROUND LUG IS ATTACHED TO ACCESS NAVIGATOR. BEFORE ATTACHING GROUND LUG SCREWS, CAREFULLY BEND THE GROUND WIRE TO POSITION THE GROUND LUG OVER THE REAR PANEL TERMINALS.**

1. Attach ground lug to chassis with screws provided.
2. Ensure that ground lug screws securely hold equipment ground lug to chassis.

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DSX-1 Cable Connections

Installation Summary

- Precautions ... 6-8
- Tools and Materials ... 6-9
- Prepare DSX-1 Cables ... 6-9
- Connect DSX-1 Cables to Access Navigator ... 6-11
- Attach Ferrite Beads ... 6-13
- Connect DSX-1 Cables to Interface or Patch Panel ... 6-14

Precautions

CAUTION! **SHIELDED DSX-1 CABLES WITH FERRITE BEAD RF SUPPRESSORS ARE REQUIRED FOR COMPLIANCE WITH NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15, TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.**

CAUTION! **DSX-1 CABLES HAVE SOLID CONDUCTOR WIRES. IF ATTACHING RJ TYPE CONNECTORS TO FLYING WIRE CABLES, BE SURE TO USE RJ CONNECTORS DESIGNED FOR SOLID WIRE. USING RJ CONNECTORS DESIGNED FOR STRANDED WIRE WILL CAUSE POOR SIGNAL CONNECTIONS AND SERVICE DISRUPTIONS.**

WARNING! **NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.**

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Tools and Materials

1. Obtain the following tools:
   - Screwdrivers, Phillips #2 and #3
   - Screwdrivers, slotted
   - Pliers, needle nose
   - Cutters, diagonal
   - Wire stripper, 16-26 AWG
   - Wire wrap tool, bits for 22, 24, 26 AWG
   - Wire unwrap tool
   - Continuity tester
2. Obtain the following materials:
   - Shielded DSX-1 cables (2 ea.), PN 005-0025 (10 ft.) or 005-0030 (25 ft.), or equivalent
   - Locking screws for DSX-1 connectors, panhead, #4-40 × 3/8" (2 ea.), part of Accessory Kit, PN 003-0247
   - Ferrite bead RF suppressors (4 ea.), part of Ferrite Bead Kit, PN 003-0197

Prepare DSX-1 Cables

1. If DSX-1 cables, PN 005-0025 (10 ft.) or 005-0030 (25 ft.), have been ordered from Carrier Access Corporation, open packages containing cables (see Figure 6-3).

NOTE: DSX-1 shield drain wire must be attached to connector on Access Navigator. Do not ground second shield drain wire at other end of cable. If second shield ground is not required for cable extensions, fold back and wrap with electrical tape.

NOTE: Two DSX-1 cables are required, one for transmit and one for receive. These cables are electrically identical, pin for pin, and may be used for either transmit or receive. DSX-1 cables come with 64-pin connectors on both ends. For wire-wrap connections, one connector may be cut off to provide flying wires. Cables are ordered and packaged separately.

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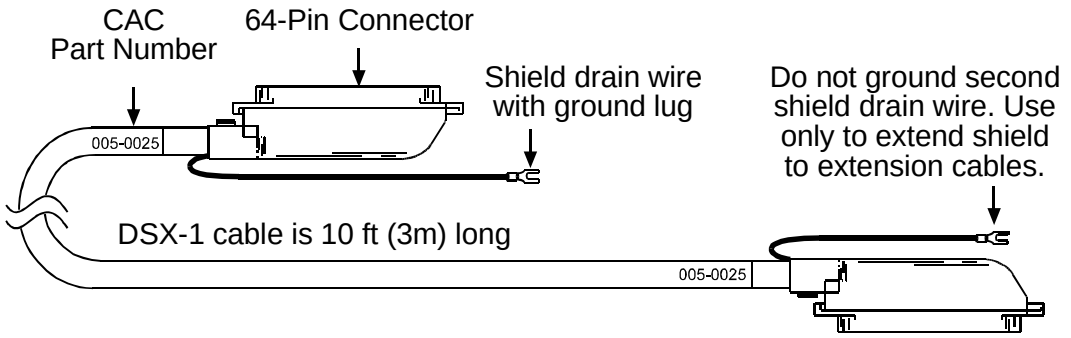

Figure 6-3. DSX-1 Cable with Two Connectors (PN 005-0025)

2. If DSX-1 cables with flying wires are needed for wire-wrap or splice connections, cut off one connector and strip back the insulation (see Figure 6-4).
   - Do not cut off connector with shield drain wire unless cable has shield drain wires at both ends. (Shield drain wire must be attached to Access Navigator.)
   - Cut off one connector to produce cable of desired length.
   - Strip back insulation to produce flying wires of desired length. (Leave some of inner bundle wrap exposed to identify wire bundle color codes.)

NOTE: ABAM shielded cable is recommended for extending DSX-1 connections.

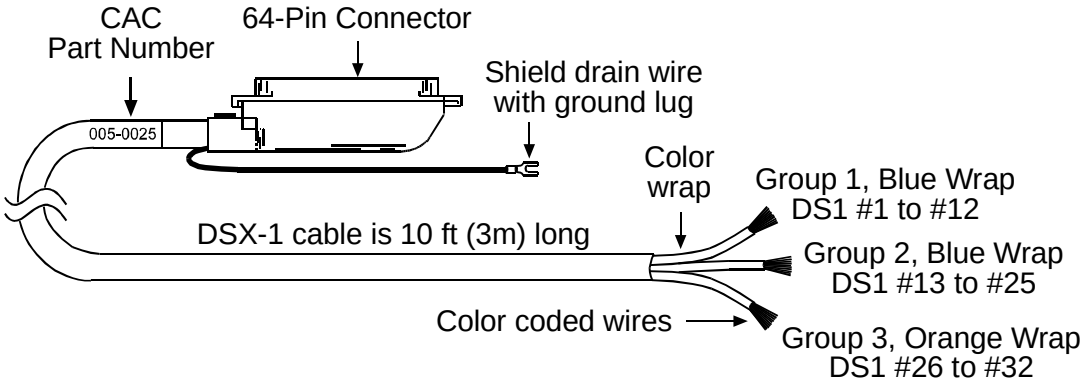

Figure 6-4. DSX-1 Cable with Flying Wires

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Connect DSX-1 Cables to Access Navigator

CAUTION! **SHIELDED DSX-1 CABLES WITH FERRITE BEAD RF SUPPRESSORS ARE REQUIRED FOR COMPLIANCE WITH NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15, TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT. ENSURE THAT SHIELD DRAIN GROUND LUG IS GROUNDED TO CHASSIS THROUGH DS1 CONNECTOR.**

NOTE: Use only #4-40 × 3/8" locking screws provided in Accessory Kit.

1. Refer to Figure 6-5.
2. Remove locking screw, if any, from DS1 Receive (IN) connector (see Figure 6-5).
3. Plug receive DSX-1 cable into DS1 Receive (IN) connector and snap clamp over cable side of connector.
4. Position spade lug of shield drain wire under connector locking screw (#4-40 × 3/8") and tighten with screw driver.
5. Verify that spade lug is firmly secured.

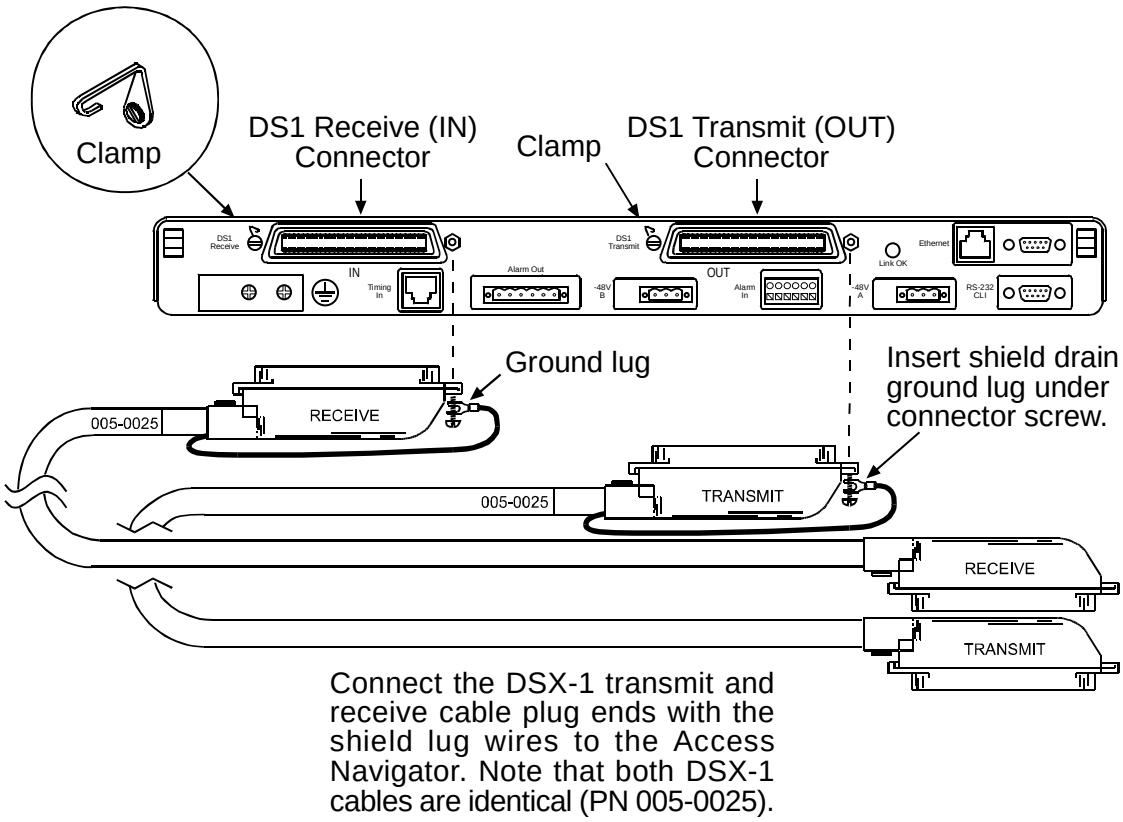
Clamp
DS1 Receive (IN) Connector
Clamp
DS1 Transmit (OUT) Connector
Ground lug
Insert shield drain ground lug under connector screw.
005-0025
RECEIVE
005-0025
TRANSMIT
RECEIVE
TRANSMIT
Connect the DSX-1 transmit and receive cable plug ends with the shield lug wires to the Access Navigator. Note that both DSX-1 cables are identical (PN 005-0025).

Figure 6-5. Location of Rear Panel DS1 Connectors

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6. Connect DSX-1 transmit (output) interface cable to Access Navigator (see Figure 6-5).
7. Remove locking screw, if any, from DS1 Transmit (OUT) connector.
8. Plug transmit DSX-1 cable into DS1 Transmit (OUT) connector and snap clamp over cable side of connector.
9. Position spade lug of shield drain wire under connector locking screw (#4-40 × 3/8") and tighten with screw driver.
10. Verify that spade lug is firmly secured.

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Attach Ferrite Beads

WARNING! NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.

1. Obtain two ferrite beads to attach each DSX-1 cable (see Figure 6-6).
2. Position ferrite beads for most convenient cable dressing and wire tying (see example in Figure 6-6). Location is not critical.
3. Open the snap-on ferrite beads along hinge cover (see Figure 6-6, Detail A).
4. Fold ferrite bead hinge covers together over DSX-1 cables. Press covers together until they snap together.

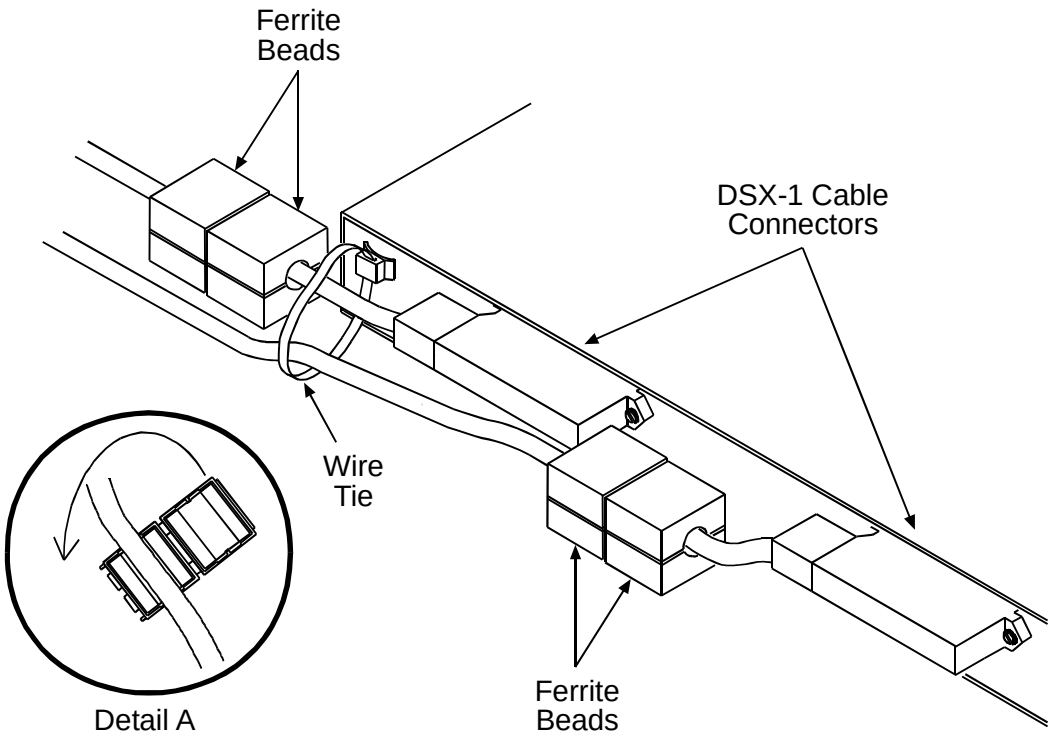

Figure 6-6. Attaching Ferrite Bead RF Suppressors

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Connect DSX-1 Cables to Interface or Patch Panel

WARNING! **NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.**

NOTE: Access Navigator can be equipped with up to 32 DS1 interfaces, in steps of 4 DS1s per Quad Framer (QF) circuit card installed. DS1 receive and transmit pairs are numbered sequentially from 1 to 32 in Table 2-1.

NOTE: ABAM shielded cable is recommended for extending DSX-1 connections.

Connect DSX-1 receive and transmit cables to DSX-1 interface or patch panel.

- Follow standard practices for DS1 signal connections.
- For DSX-1 cable pin connections and flying wire colors, refer to Table 2-1.

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Table 2-1 . DSX-1 Cable Pin Connections and Flying Wire Colors

DSX-1 Circuit	Transmit Pins and Color		Receive Pins and Color		QF Card	Wire Group
	Tx Tip	Tx Ring	Rx Tip	Rx Ring		
1	33 white/blue	1 blue/white	33 white/blue	1 blue/white	1	1 blue wrap
2	34 white/orange	2 orange/white	34 white/orange	2 orange/white		
3	35 white/green	3 green/white	35 white/green	3 green/white		
4	36 white/brown	4 brown/white	36 white/brown	4 brown/white		
5	37 white/slate	5 slate/white	37 white/slate	5 slate/white	2	
6	38 red/blue	6 blue/red	38 red/blue	6 blue/red		
7	39 red/orange	7 orange/red	39 red/orange	7 orange/red		
8	40 red/green	8 green/red	40 red/green	8 green/red		
9	41 red/brown	9 brown/red	41 red/brown	9 brown/red	3	
10	42 red/slate	10 slate/red	42 red/slate	10 slate/red		
11	43 black/blue	11 blue/black	43 black/blue	11 blue/black		
12	44 black/orange	12 orange/black	44 black/orange	12 orange/black		

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Table 2-1 . DSX-1 Cable Pin Connections and Flying Wire Colors (Continued)

DSX-1 Circuit	Transmit Pins and Color		Receive Pins and Color		QF Card	Wire Group
	Tx Tip	Tx Ring	Rx Tip	Rx Ring		
13	45 black/green	13 green/black	45 black/green	13 green/black	4	2 blue wrap
14	46 black/brown	14 brown/black	46 black/brown	14 brown/black		
15	47 black/slate	15 slate/black	47 black/slate	15 slate/black		
16	48 yellow/blue	16 blue/yellow	48 yellow/blue	16 blue/yellow		
17	49 yellow/ orange	17 orange/ yellow	49 yellow/ orange	17 orange/ yellow	5	
18	50 yellow/green	18 green/yellow	50 yellow/green	18 green/yellow		
19	51 yellow/brown	19 brown/yellow	51 yellow/brown	19 brown/yellow		
20	52 yellow/slate	20 slate/slate	52 yellow/slate	20 slate/yellow		
21	53 violet/blue	21 blue/violet	53 violet/blue	21 blue/violet	6	
22	54 violet/orange	22 orange/violet	54 violet/orange	22 orange/violet		
23	55 violet/green	23 green/violet	55 violet/green	23 green/violet		
24	56 violet/brown	24 brown/violet	56 violet/brown	24 brown/violet		
25	57 violet/slate	25 slate/violet	57 violet/slate	25 slate/violet	7	
26	58 white/blue	26 blue/white	58 white/blue	26 blue/white		3 orange wrap
27	59 white/orange	27 orange/white	59 white/orange	27 orange/white		
28	60 white/green	28 green/white	60 white/green	28 green/white		
29	61 white/brown	29 brown/white	61 white/brown	29 brown/white	8	
30	62 white/slate	30 slate/white	62 white/slate	30 slate/white		
31	63 red/blue	31 blue/red	63 red/blue	31 blue/red		
32	64 red/orange	32 orange/red	64 red/orange	32 orange/red		

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RS-232 Management Connection

Installation Summary

- Precautions ... 6-17
- Information, Tools, and Materials ... 6-17
- Connect Shielded RS-232 Cable ... 6-19
- Attach Ferrite Bead RF Suppressor ... 6-20
- Preconfigure Optional Modem ... 6-21

Precautions

CAUTION! SHIELDED RS-232 CABLE WITH FERRITE BEAD RF SUPPRESSOR IS REQUIRED FOR COMPLIANCE WITH NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15, TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.

Information, Tools, and Materials

1. Obtain the following information:
   - System ID or CLLI code
2. Obtain the following tools:
   - Screwdrivers, Phillips #2 and #3
   - Screwdrivers, slotted
3. Obtain the following materials:
   - For Direct Connection – to connect the Access Navigator directly to a computer, craft terminal, or Network Operations Center, you will need a shielded RS-232 DTE-to-DCE cable (see Figure 6-7). This is the standard (or straight) cable used for connecting a computer to modems and other DCE devices.
   - For Modem Connection – to connect the Access Navigator to a modem for remote operation over a telephone line, you will need a pre-configured modem (see *Preconfigure Optional Modem* on page 6-21) and an RS-232 DCE-to-DCE cable (see Figure 6-8). This is also called a null modem cable. If this cable is not available, you can easily make one.
   - Ferrite bead RF suppressor (1 ea.), part of Ferrite Bead Kit, PN 003-0197

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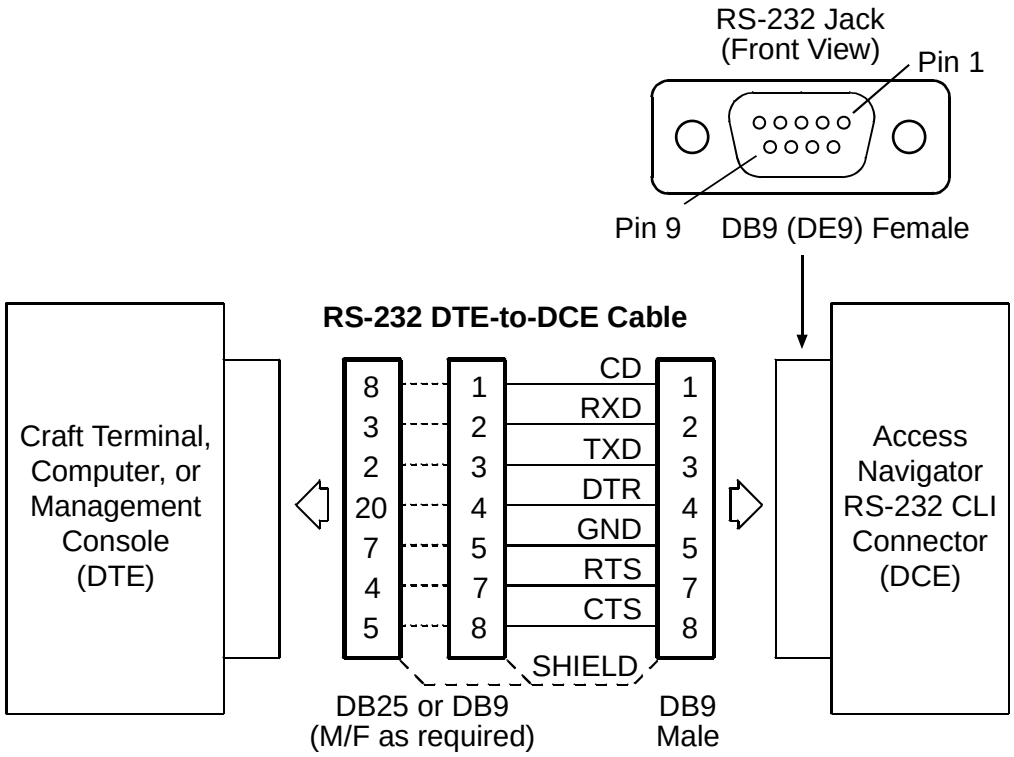

Figure 6-7. RS-232 DTE-to-DTE Cable Connections

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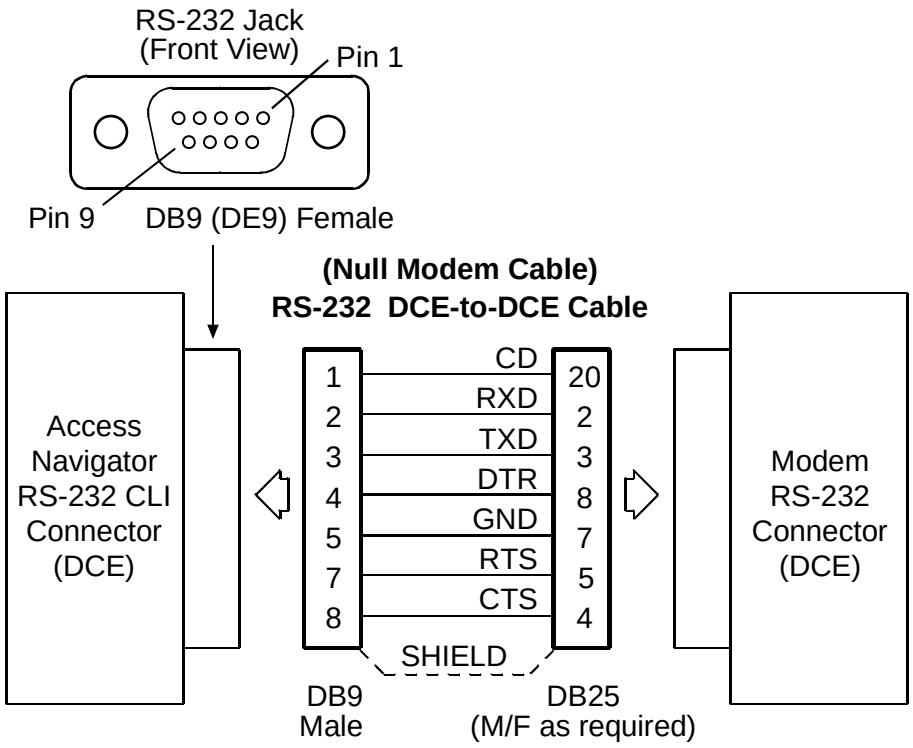

Figure 6-8. RS-232 DCE-to-DCE Modem Cable Connections

Connect Shielded RS-232 Cable

1. Connect RS-232 cable with DB9 (DE9) connector on one end to RS-232 CLI management connector on rear panel of Access Navigator (see Figure 6-9).
2. Connect other end of RS-232 cable to the computer, craft terminal, management station, or modem.

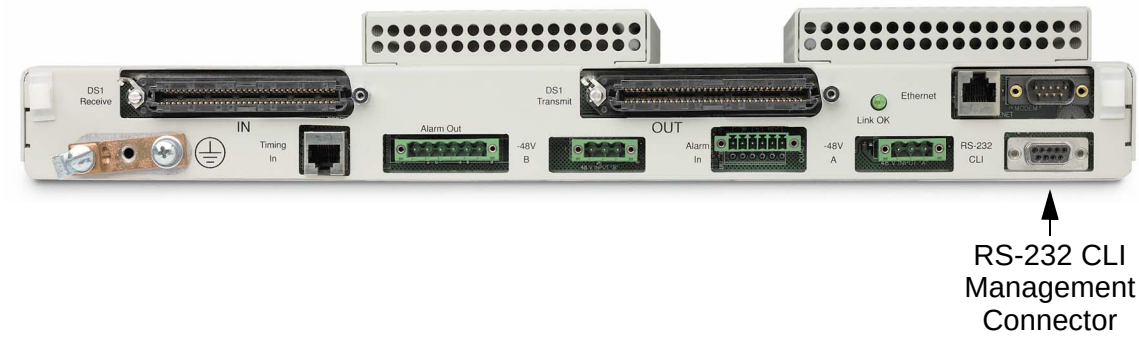

Figure 6-9. Location of RS-232 CLI Connector

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Attach Ferrite Bead RF Suppressor

CAUTION! SHIELDED RS-232 CABLE WITH FERRITE BEAD RF SUPPRESSOR IS REQUIRED FOR COMPLIANCE WITH NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15, TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.

1. Position ferrite bead for most convenient cable dressing and wire tying. Location is not critical.
2. Open the snap-on ferrite beads along hinge cover (see Detail A in Figure 6-10).
3. Loop RS-232 cable so that cable passes through center of ferrite bead twice (see Detail B).
4. Fold ferrite bead hinge covers together over RS-232 cable. Press covers together until they snap together.

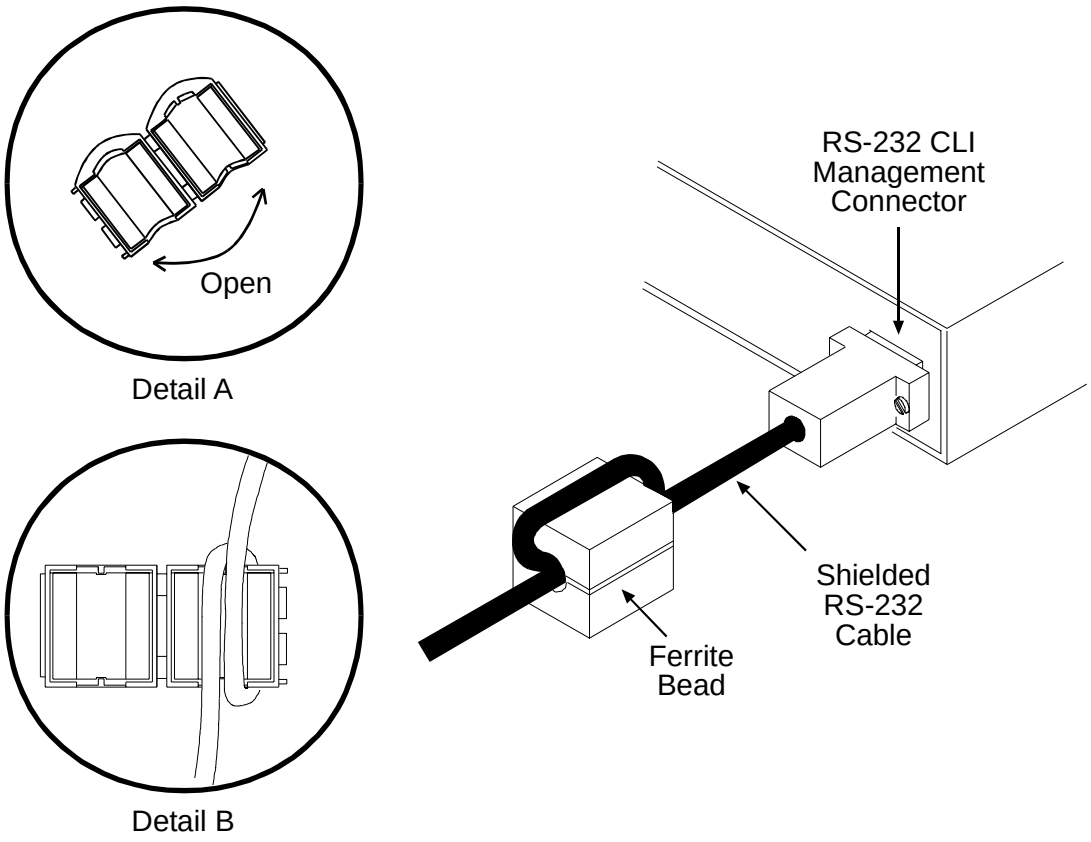

Figure 6-10. Attaching Ferrite Bead RF Suppressor

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Preconfigure Optional Modem

1. If a modem is to be connected to the Access Navigator for remote operation, the modem must be pre-configured before installation and connection to the Access Navigator's RS-232 CLI management port. Preconfigure the modem as follows:
2. Connect modem to a computer, using an appropriate RS-232 cable.
3. Apply power to the modem.
4. On the computer, start up a terminal emulation program such as HyperTerminal and send the following initialization string to the modem:

```
at s0=1 e0 q1 &c0 &d0 &w
```

NOTE: The above initialization string uses Hayes compatible modem commands for attention (at), auto-answer (s0=1), no local echo (e0), no result codes (q1), no hardware handshake (&c0 &d0), and write configuration into non-volatile RAM (&w). If the modem is not Hayes compatible, substitute equivalent commands.

5. Disconnect modem from computer.
6. Connect RS-232 cable from modem to Access Navigator RS-232 CLI management port.

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Ethernet Management Connection

NOTE: An Ethernet connection is required for management by Telnet, SNMP, Valet™ or NetworkValet™ EMS software.

Installation Summary

- Make Ethernet Cable (Optional) ... 6-22
- Connect Ethernet Cable to Access Navigator ... 6-24
- Connect Ethernet Cable to Ethernet Hub ... 6-24

Information and Materials

1. Obtain the following information:
   - IP address of Access Navigator
   - Subnet mask
   - Gateway address (if used)
2. Obtain the following materials:
   - Ethernet 10Base-T cable with RJ45 connector, or
   - Materials to make Ethernet cable (if required)
   - Continuity tester

NOTE: Ethernet Cable – The Access Navigator provides an Ethernet 10Base-T MDI port for use with Ethernet EIA/TIA-568B RJ45 cables using shielded twisted pair (UTP) wires. Cables should be rated for Category 3 (CAT3) or better. (CAT3 is acceptable for 10Base-T, while CAT5 may be used for either 10Base-T or 100Base-T.

Make Ethernet Cable (Optional)

NOTE: Ethernet Cables come in two types: straight and crossover.
The Access Navigator has an Ethernet MDI port. Data terminal equipment (DTE) such as computers and printers have MDI ports. Ethernet hubs have MDI-X ports, in which the receive and transmit signals are opposite from the MDI port.
• "Straight" cables, by far the most common, have identical pin connections at both ends and are used to connect an MDI port to an MDI-X port. This is the usual way to connect the Access Navigator to an Ethernet hub.
• A "crossover" cable is sometimes used for troubleshooting because it isolates the DTE unit from the local area network. A crossover cable has the transmit (T) and receive (R) pairs swapped at each end and is used to connect two MDI ports or two MDI-X ports. A

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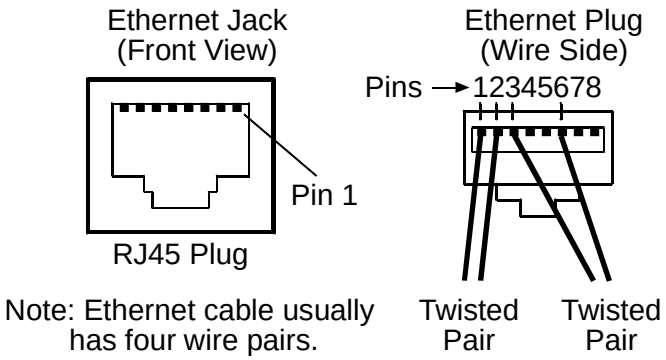
crossover cable can be used to directly connect the Access Navigator to a laptop computer with Ethernet port and Telnet software.



RJ45 PINS	MDI PORT SIGNALS
1 2	T+ T–
3 6	R+ R–
4 5	Not Used
7 8	Not Used

Figure 6-11. Ethernet Cable Construction

To make a straight Ethernet cable, perform the following steps (see Figure 6-11).

- Follow standard practices for Ethernet connections.
- Use RJ45 connectors.
- Use cable rated for Category 3 (CAT3) or better.
- Use straight cable wiring, with identical pin connections on both plug ends.
- Use twisted pair wires for receive pair and transmit pair.
- Use continuity tester to verify pin connections.

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Connect Ethernet Cable to Access Navigator

Connect Ethernet cable to Ethernet connector on rear panel of Access Navigator. Push plug in until it clicks in place.

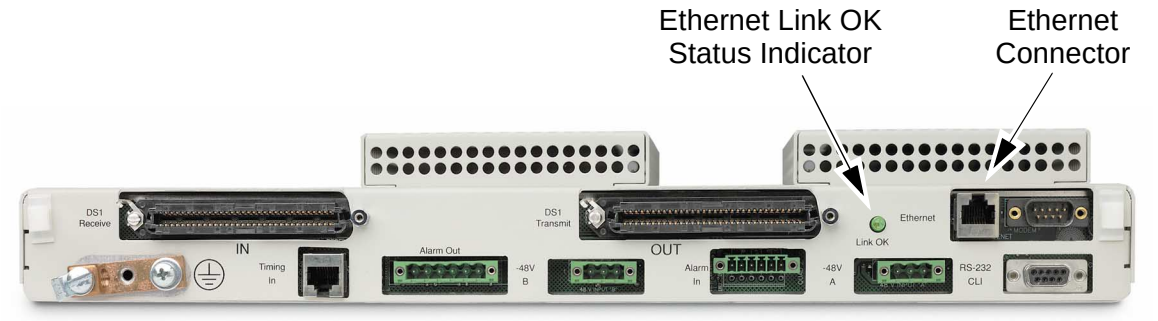

Figure 6-12. Location of Ethernet Connector and Indicator

Connect Ethernet Cable to Ethernet Hub

Connect other end of Ethernet cable to an Ethernet hub or computer interface card.

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External Timing Source (BITS) Connection

The Access Navigator has a Timing Input connector for use with an external timing source, such as a Building Integrated Timing Supply (BITS), to synchronize wireline transmissions.

Installation Summary

- Tools and Materials ... 6-25
- Make BITS Cable (Optional) ... 6-26
- Connect BITS Cable ... 6-26

Tools and Materials

Obtain the following tools and materials:

- ANSI T1.403 RJ48C timing input cable, or materials to make timing cable (see Step 2)
- Continuity tester

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Make BITS Cable (Optional)

To make an RJ48C timing input cable, perform the following steps (see Figure 6-13).

- Follow standard practices for wiring cables.
- Use RJ48 connectors.
- Use cable rated for Category 3 (CAT3) or better.
- Use straight cable wiring, with identical pin connections on both plug ends.
- Use twisted pair wires for receive pair.
- Use continuity tester to verify pin connections.

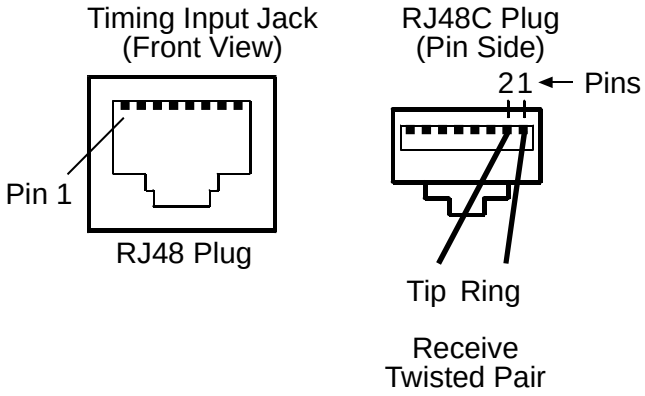

Figure 6-13. RJ48C Cable Construction

Connect BITS Cable

Connect RJ48C timing input cable to Timing In connector on rear panel of Access Navigator (see Figure 6-14). Push plug in until it clicks in place.

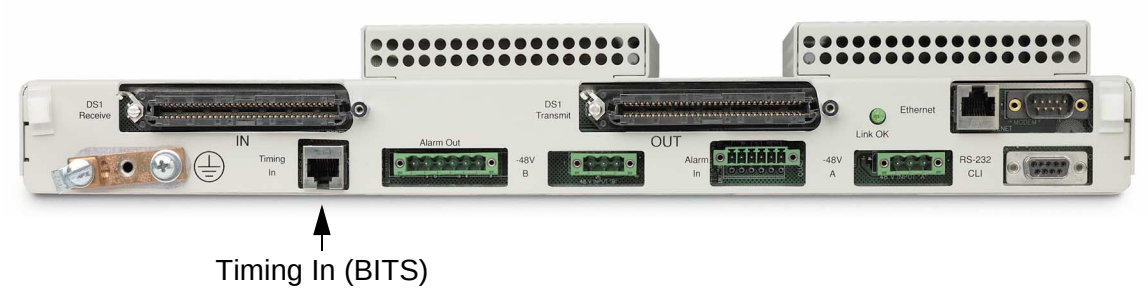

Figure 6-14. Location of Timing Input (BITS) Connector

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Alarm Output Connections

Installation Summary

- Precautions ... 6-27
- Tools and Materials ... 6-27
- Wire Alarm Output Connector ... 6-28
- Plug Output Alarm Connector into Access Navigator ... 6-30

Precautions

DANGER! **OBSERVE EXTREME CAUTION IF FACILITY ALARM SYSTEM USES HIGH VOLTAGE.**

WARNING! **DO NOT EXCEED MAXIMUM RELAY CONTACT RATINGS OF 1 AMPERE AT 110 VOLTS AC OR DC. EXCESSIVE CURRENT OR VOLTAGE WILL DAMAGE THE RELAY CONTACTS IN THE ACCESS NAVIGATOR.**

Tools and Materials

Obtain the following tools and materials:

- Pliers, needle nose
- Cutters, diagonal
- Wire stripper, 16-26 AWG
- Continuity tester
- Volt-ohm meter
- 16 to 26 AWG insulated copper wire for alarm connections, as required by standard wiring practices

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Wire Alarm Output Connector

1. Open package containing alarm output connector (see Figure 6-15).

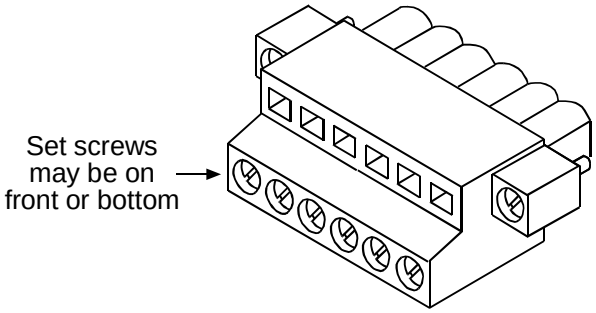

Figure 6-15. Alarm Output Connector

NOTE: Figure 6-16 shows the alarm output connector wiring to a typical alarm interface circuit. The alarm relay output provides normally open contacts. There is no voltage present on these contacts until they are energized by the external alarm system.

2. Refer Figure 6-16 and Figure 6-17 when wiring connector to facility alarm system.
3. Use volt-ohm meter to ensure that **no voltage** is present on any of the wires going to the facility alarm system (see Figure 6-16).
4. Strip the wires so that 5/16 inch of bare wire is exposed (see Figure 6-17).
5. Orient the alarm output connector as shown in Figure 6-17.
6. Insert wire into top opening, then tighten screw below to clamp wire in place.
7. Ensure that no bare wire shows after the wires are installed.

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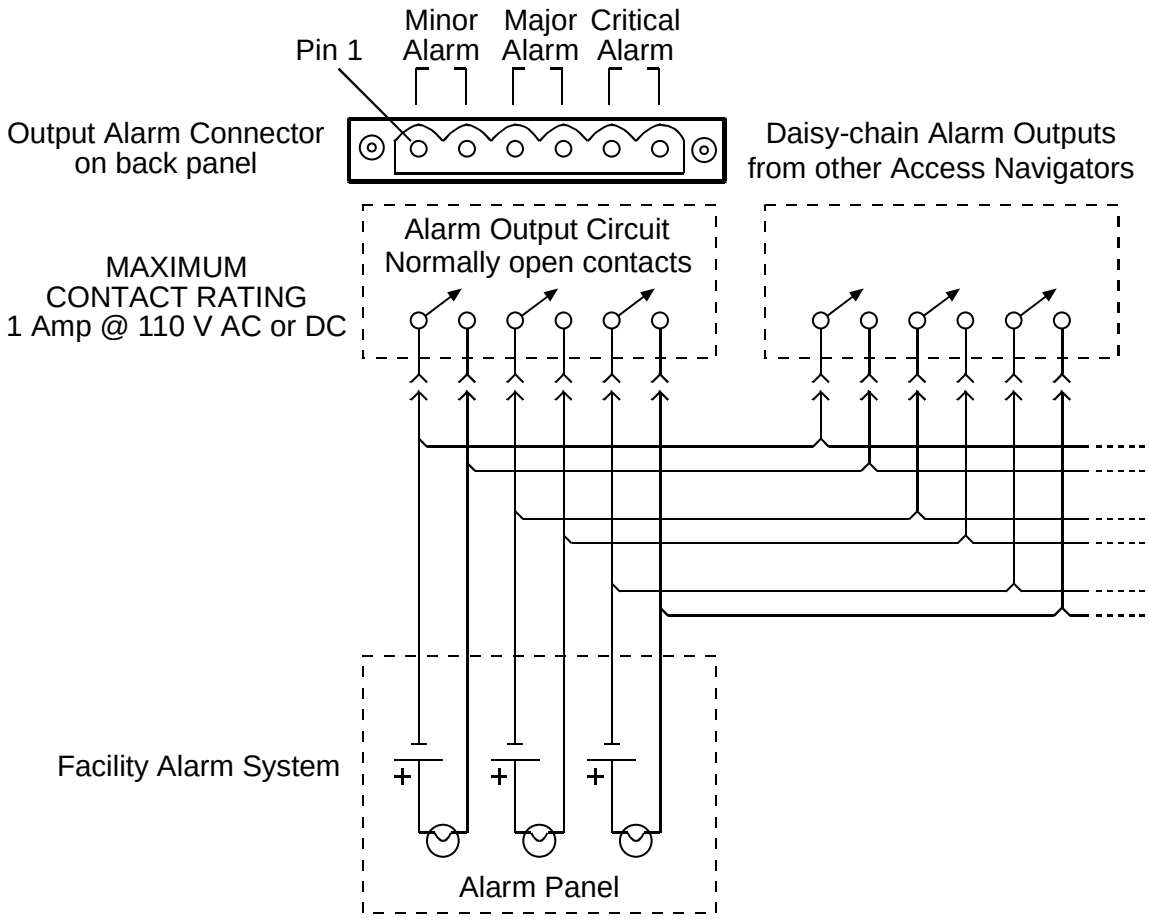

Figure 6-16. Typical Connections to Facility Alarm System

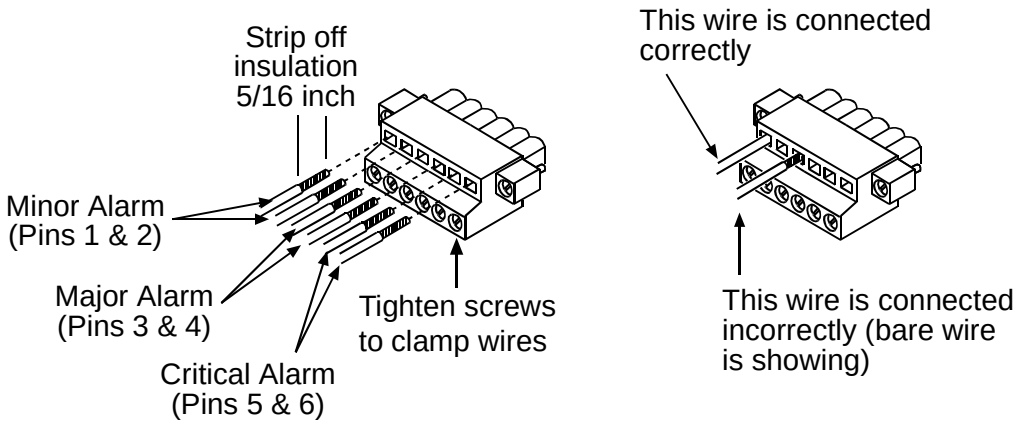
Strip off insulation 5/16 inch
Minor Alarm (Pins 1 & 2)
Major Alarm (Pins 3 & 4)
Critical Alarm (Pins 5 & 6)
Tighten screws to clamp wires
This wire is connected correctly
This wire is connected incorrectly (bare wire is showing)

Figure 6-17. Alarm Output Connector Wiring

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Plug Output Alarm Connector into Access Navigator

Plug connector into Access Navigator Alarm Out connector (see Figure 6-18).

- Inspect connectors to ensure that no bare copper wire is exposed.

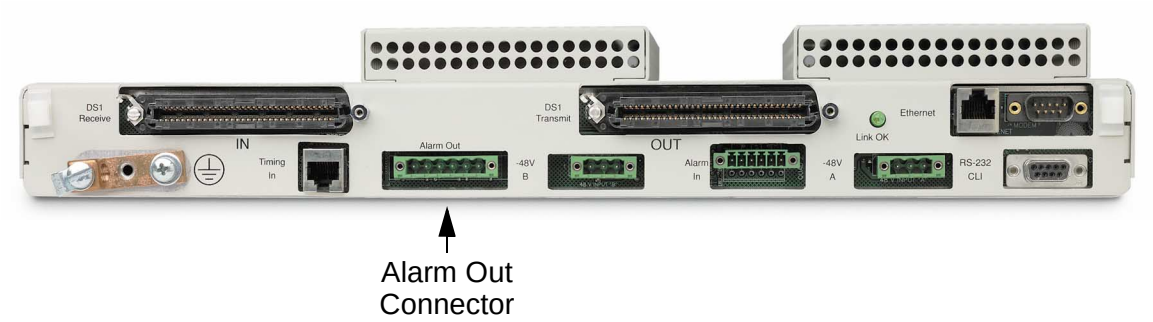

Figure 6-18. Location of Rear Panel Alarm Output Connector

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Alarm Input Connections

Installation Summary

- Precautions ... 6-31
- Tools and Materials ... 6-31
- Wire Alarm Input Connector ... 6-32
- Plug Alarm Input Connector into Access Navigator ... 6-34

Precautions

CAUTION! **WIRE LOOP RESISTANCE MUST BE LESS THAN 8 OHMS (OR ABOUT 250 FT. OF 22 AWG ABAM CABLE) TO ENSURE DETECTION OF CONTACT CLOSURE. LONG WIRES SHOULD BE SHIELDED TO PREVENT FALSE ALARMS FROM INDUCED VOLTAGES.**

WARNING! **DO NOT APPLY EXTERNAL VOLTAGE TO ALARM INPUT CONNECTOR. THIS INTERFACE IS DESIGNED FOR OPERATION WITH EXTERNAL SWITCHES OR RELAYS PROVIDING ISOLATED CONTACTS WITH MINIMUM CONTACT RATINGS OF 60V DC @ 10 MA.**

Tools and Materials

Obtain the following tools and materials:

- Pliers, needle nose
- Cutters, diagonal
- Wire stripper, 16-26 AWG
- Continuity tester
- Volt-ohm meter
- 16 to 26 AWG insulated, shielded copper wire for alarm connections, as required by standard wiring practices.

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Wire Alarm Input Connector

1. Open package containing alarm input connector.

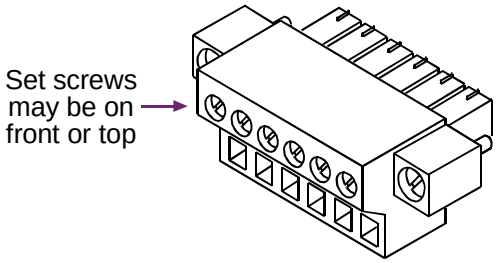

Figure 6-19. Alarm Input Connector

2. Refer to Figure 6-20 and Figure 6-21 when wiring connector to facility alarm system.
3. Use volt-ohm meter to ensure that no voltage is present on any of the wires from the facility alarm system (see Figure 6-21).
4. Strip the wires so that 5/16 inch of bare wire is exposed (see Figure 6-20).
5. Orient the alarm output connector as shown in Figure 6-20.
6. Insert wire into bottom opening, then tighten screw above to clamp wire in place.
7. Ensure that no bare wire shows after the wires are installed.
8. Connect cable shield to Access Navigator chassis ground or to its equipment rack. Do not ground both ends of shield.

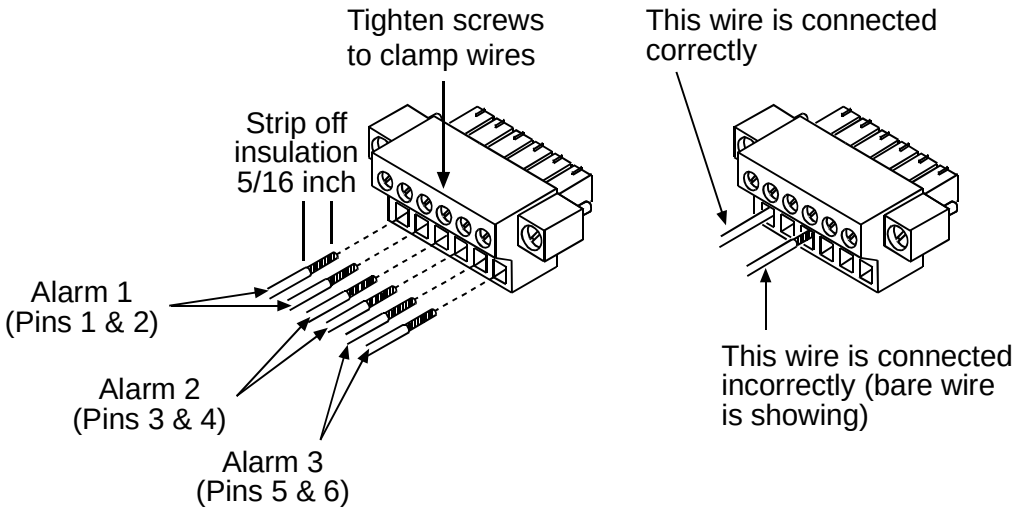

Figure 6-20. Alarm Input Connector Wiring

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NOTE: Figure 6-21 shows the alarm input connector wiring to a typical alarm interface circuit. The facility alarm input to the Access Navigator should provide normally open contacts. The Access Navigator will energize these wires so that a contact closure will produce a minor alarm indication and minor alarm message.

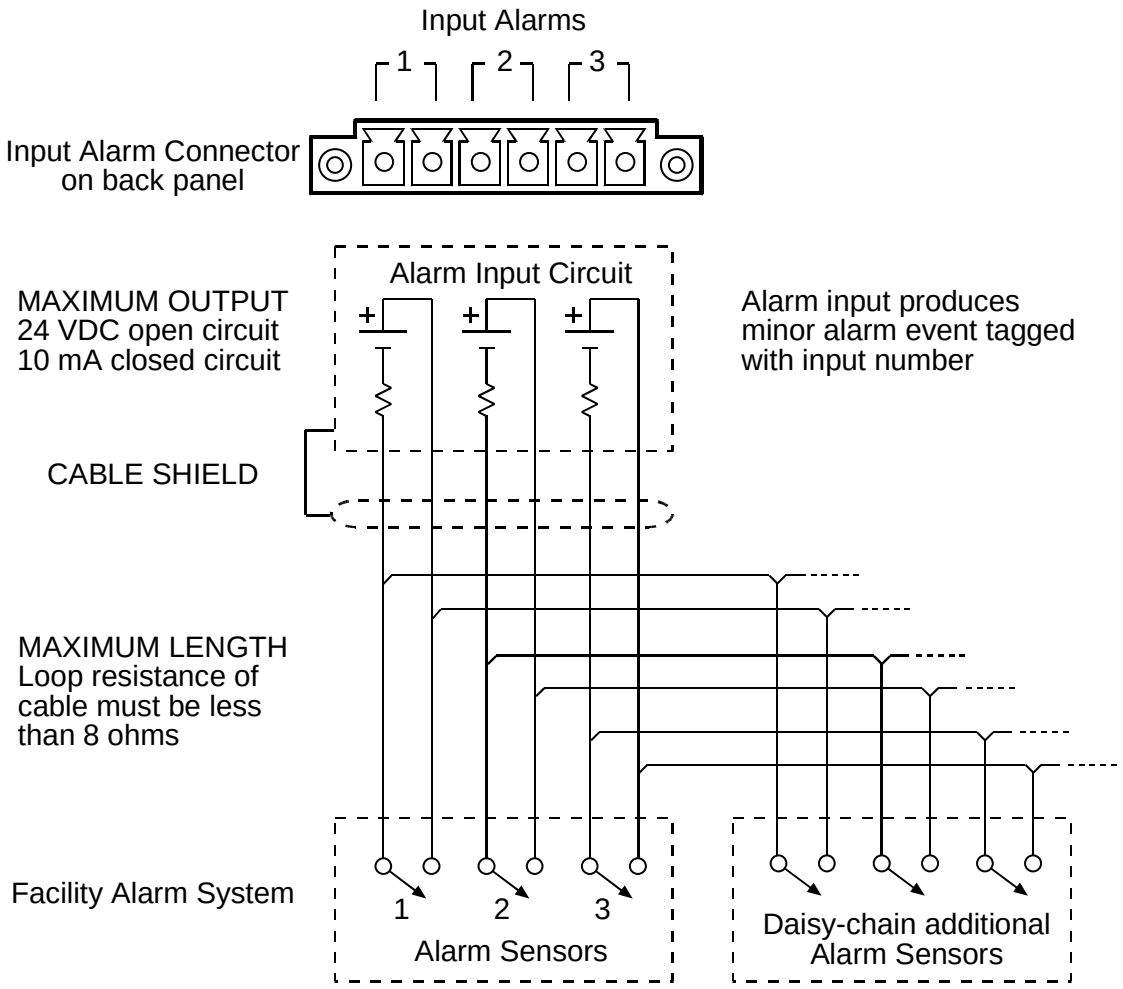

Figure 6-21. Typical Connections to Facility Alarm System

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Plug Alarm Input Connector into Access Navigator

Plug connector into Access Navigator Alarm In connector.

- Inspect connectors to ensure that no bare copper wire is exposed.

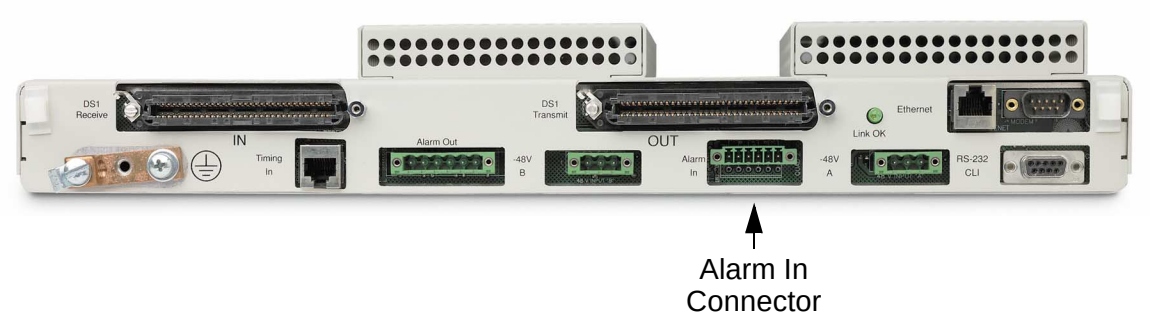

Figure 6-22. Location of Rear Panel Alarm Input Connector

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DC Power Connections

Installation Summary

- Precautions ... 6-35
- Tools and Materials ... 6-35
- Wire Power Connectors ... 6-36
- Verify Wiring ... 6-37
- Connect Power Plugs to Access Navigator ... 6-37

Precautions

DANGER! **HIGH VOLTAGE SHOCK HAZARD. DO NOT WIRE CONNECTORS WHILE POWER IS ON.**

CAUTION! **BOTH POWER CONNECTORS MUST BE WIRED AND CONNECTED TO POWER SOURCES. FAILURE TO DO SO WILL DISABLE REDUNDANT SWITCHING FEATURES AND MAY INTERRUPT SERVICE.**

WARNING! **POWER INPUT CONNECTORS ARE FOR –48V DC POWER ONLY.**

Tools and Materials

NOTE: If the power connector is wired to a fuse panel, use a 5.0 Amp slow-blow fuse.

Obtain the following tools and materials:

- Pliers, needle nose
- Cutters, diagonal
- Wire stripper, 16-26 AWG
- Continuity tester
- Volt-ohm meter
- 16 or 18 AWG insulated copper wire for power connections, as required by standard wiring practices

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Wire Power Connectors

DANGER! **HIGH VOLTAGE SHOCK HAZARD. DO NOT WIRE CONNECTORS WHILE POWER IS ON.**

CAUTION! **BOTH POWER CONNECTORS MUST BE WIRED AND CONNECTED TO POWER SOURCES. FAILURE TO DO SO WILL DISABLE REDUNDANT SWITCHING FEATURES AND MAY INTERRUPT SERVICE.**

WARNING! **DO NOT APPLY POWER UNTIL TOLD TO DO SO. INCORRECT WIRING CAN DAMAGE THE ACCESS NAVIGATOR OR THE POWER SOURCE.**

NOTE: The Access Navigator has redundant internal power converters, one on each Controller card. Two power input connectors are provided and both must be wired to a –48V DC power source. It is recommended that each Controller card be powered independently from separate power source. That way, if a Controller card or power source fails, the redundant Controller card is capable of powering all circuits in the Access Navigator. If separate –48V DC power sources are not available, then both power connectors must be wired to the same power source.

1. Open package containing 3-pin power connectors (2 ea.) (see Figure 6-23).

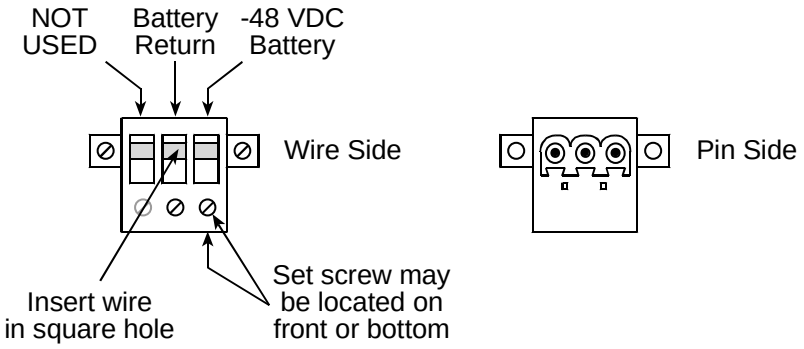

Figure 6-23. Power Connector Wiring

2. Wire each connector to a –48V DC power source providing –42V to –58V power.
3. Follow standard practice for power wiring.
4. 16 or 18 AWG insulated copper wire is recommended. (Connectors will accept 12 to 24 AWG solid or stranded wire.)
5. Ensure that no power is present on the two wires to be connected. (Remove fuse or turn off circuit breaker at power distribution panel.)
6. Strip the two wires from the power source so that 5/16 inch of bare wire is exposed.

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7. Orient the connector as shown in Figure 6-23 and loosen the right two set screws.
8. Insert the Battery Return and –48V VDC Battery wires into the appropriate square holes (see Figure 6-23), one at a time, tightening the set screws as you go.
9. Ensure that no bare wires are exposed.

Verify Wiring

WARNING! INCORRECT VOLTAGE POLARITY CAN DAMAGE ACCESS NAVIGATOR.

1. Use voltmeter to verify wiring of both power connectors (Figure 6-24) before plugging into Access Navigator.
2. Apply power to connector. (Replace fuse or turn on circuit breaker.)
3. Touch voltmeter probes to screw clamps below pins 2 and 3 of connector plug.
4. Verify that voltage is between –42V and –58V DC.
5. Verify that voltage is correct polarity.
6. Turn off power to connectors.

Connect Power Plugs to Access Navigator

1. Plug connectors into Access Navigator power input connectors (see Figure 6-24).
2. Plug one power plug into the rear panel connector market –48V A.
3. Plug other power plug into the rear panel connector market –48V B.
4. Inspect connectors to ensure that no bare copper wire is exposed.

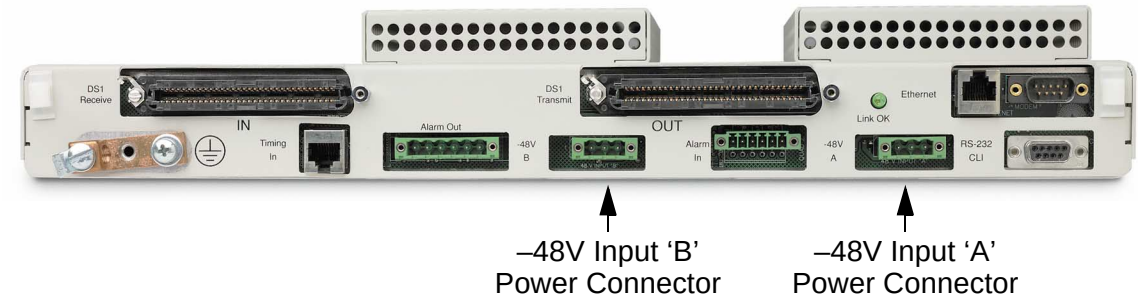

Figure 6-24. Location of Rear Panel Power Input Connectors

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Dress Cables and Wires

Installation Summary

- Tools and Materials ... 6-38
- Dress Cables and Wires ... 6-38

Tools and Materials

Obtain the following tools and materials:

- Pliers, needle nose
- Cutters, diagonal
- Wire ties (3 ea.), part of Accessory Kit, PN 003-0247

Dress Cables and Wires

Dress cables and wires as follows.

- Follow standard practice.
- If desired, use wire tie anchors on rear panel (see Figure 6-25) to secure wires.
- Ferrite bead RF suppressors may be moved slightly to allow for securing wire ties.
- When mounted horizontally, the ground wire and DSX-1 cables are normally dressed toward left side of rack and all other cables and wires are dressed toward right side, as viewed from connector panel (Figure 6-25).
- Ensure that no bare wires are exposed after dressing.

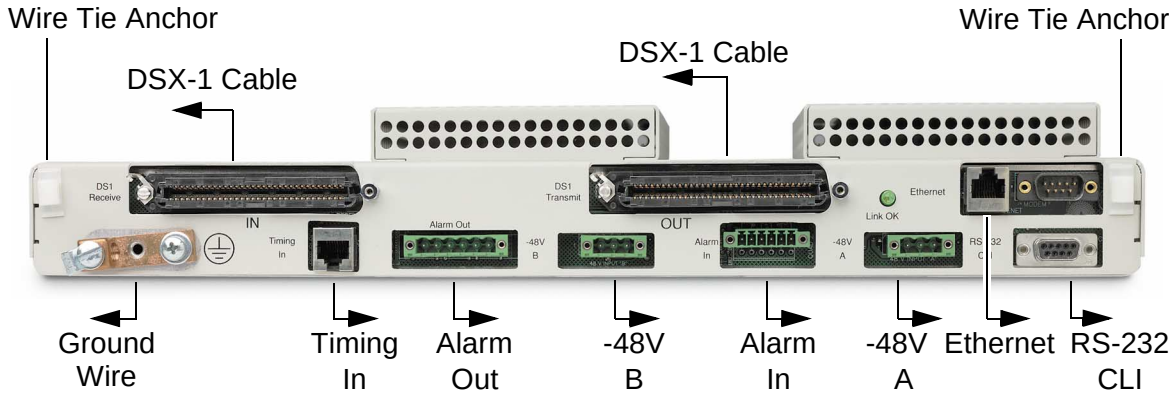

Figure 6-25. Location of Rear Panel Wire Tie Anchors and Connectors

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Acceptance Test

Verification Summary

- Apply Power and Verify Operation ... 6-40
- Verify Chassis Ground Connection ... 6-41
- Verify DSX-1 Connections ... 6-41
- Verify RS-232 Management Connection ... 6-42
- Verify Ethernet Cable Connection ... 6-43
- Verify Ethernet Management Connection ... 6-43
- Verify BITS Connection ... 6-44
- Verify Alarm Output Connections ... 6-45
- Verify Alarm Input Connections ... 6-47
- Exit Management Session ... 6-48

NOTE: If connections appear to be correct but unit fails the verification requirements, refer to *Diagnostics & Troubleshooting* on page 15-1.

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Apply Power and Verify Operation

1. Apply –48 VDC power to Access Navigator and verify the following front panel status indications (see Figure 6-26).

   Requirement: CONTROLLER A POWER indicator lights green.

   Requirement: CONTROLLER A ACTIVE indicator lights green.

2. If second (redundant) controller is present, verify the following front panel status indications.

   Requirement: CONTROLLER B POWER indicator lights green.

   Requirement: CONTROLLER B ACTIVE indicator is off.

NOTE: If power indicators do not light, check power connections (see *DC Power Connections* on page 6-35).

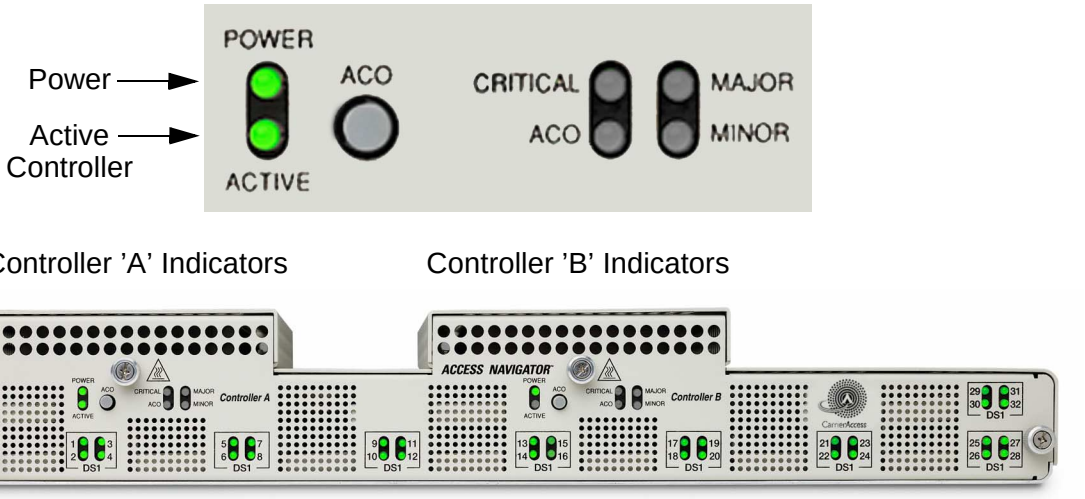

Figure 6-26. Location of Front Panel Power-On Status LEDs

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Verify Chassis Ground Connection

Follow standard practices to verify chassis ground connection to building ground system.

Verify DSX-1 Connections

NOTE: Acceptance test requires temporary loopback between the DSX-1 transmit and DSX-1 receive connectors, either by cross-connecting DS1s at the patch panel or by plugging a DSX-1 cable from the transmit output to the receive input connectors. The Access Navigator can be equipped with up to 32 DS1 interfaces.

1. Establish temporary loopback or cross-connect between DS1 receive and transmit signals at the DSX-1 interface or patch panel.
2. Turn on –48 VDC power, if not already on.
3. Verify the following front panel status indications (see Figure 6-27).

   Requirement: DS1 status indicators light green for all installed circuit cards when DS1 transmit outputs are looped back to DS1 receive inputs.

NOTE: If status indications are incorrect, refer to *Diagnostics & Troubleshooting* on page 15-1.

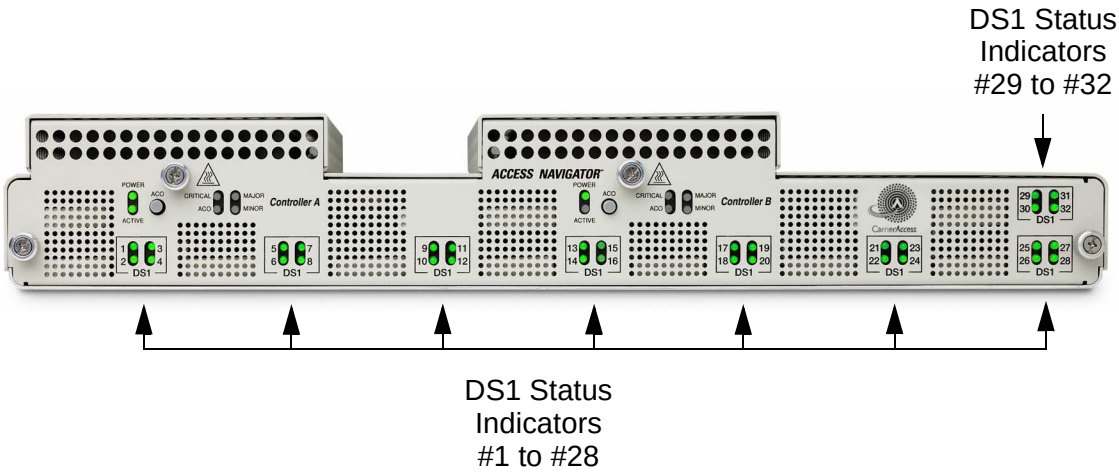

Figure 6-27. Location of Front DS1 Status Indicators

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Verify RS-232 Management Connection

NOTE: Security – No names or passwords are required for new installation and initial turn up. The Access Navigator will accept any user, until password security is turned on.

NOTE: Command Line Interface – The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages. See *Command Line Interface Conventions* on page 7-3 for a short description of the conventions used in this manual to represent management commands, settings, and messages. For additional information, see *CLI Language Reference* on page 18-1.

1. Turn on power to computer, craft terminal, and optional modem (if used).
2. Configure computer terminal emulation software, or craft terminal, as follows:
   - Terminal emulation: ANSI, ASCII, VT100
   - Flow control: None
   - Send mode: echo characters locally
   - Baud rate: 9600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1

NOTE: In the following step, it is only important that the Access Navigator respond with a message. A typical message includes the name of the unit, the time and date, and a prompt.

3. Initiate RS-232 management session by pressing keyboard Enter or Return key.

```
Carrier Access Corporation Access Navigator

08:30:45 01/30/1999

Access Navigator>
```

Requirement: Access Navigator message appears on computer or craft terminal display.

NOTE: If there is no response from the Access Navigator, refer to *Diagnostics & Troubleshooting* on page 15-1.

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Verify Ethernet Cable Connection

Verify Ethernet cable connection to network by observing the Ethernet link status indicator on the rear panel (see Figure 6-28).

Requirement: Ethernet link status indicator lights green.

NOTE: If Ethernet status indicator does not light, the Access Navigator is not receiving Ethernet pulses over the cable connection to the network. Check cable wiring and ensure that other end of cable is connected to an active Ethernet hub or interface card.

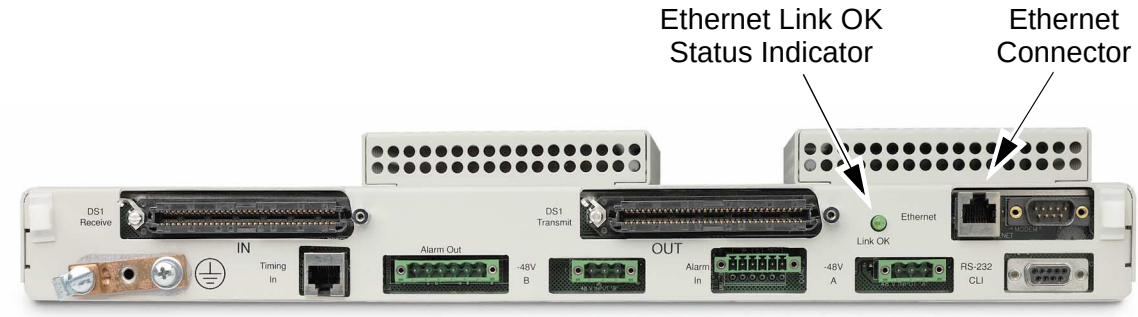

Figure 6-28. Location of Ethernet Link Indicator

Verify Ethernet Management Connection

1. Verify Ethernet operation by initiating a Telnet session to the Access Navigator's IP address. (This can also be done remotely from the network operations center.) The Access Navigator should respond with a message similar to the following. If necessary, press Return or Enter key to display message:

```
Telnet session

Carrier Access Corporation Access Navigator

08:43:30 01/02/1998

Access Navigator>
```

Requirement: Access Navigator responds when Telnet session is initiated.

NOTE: If there is no response from the Access Navigator, refer to *Diagnostics & Troubleshooting* on page 15-1.

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Verify BITS Connection

1. Ensure that BITS input cable is connected to Timing In connector on rear panel of Access Navigator (see Figure 6-29). Plug must be pushed in until it clicks in place.

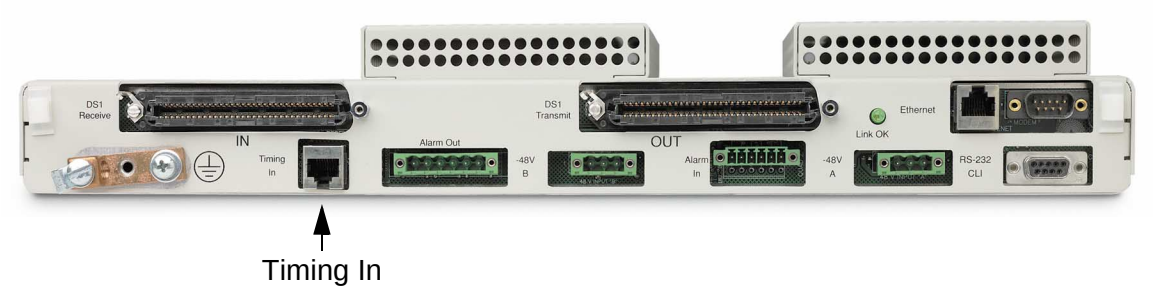

Figure 6-29. Location of Timing Input (BITS) Connector

NOTE: If the primary and secondary clock sources must be restored after testing the BITS input, use the **`status clock`** command to display the current settings and then restore them after the test with the **`set clock1`** and **`set clock2`** commands.

2. Enter following commands to assign the BITS input as the primary and secondary clock source:

```
set clock1 bits
set clock2 bits
```

3. Display clock status:

```
status clock
```

A message similar to the following will appear.

```
Primary:
  Clock Source:      BITS
  Clock Status:      In Service
Secondary:
  Clock Source:      BITS
  Clock Status:      In Service
```

NOTE: If the Clock Status for BITS source shows “Not in Service”, the BITS clock source is probably missing or too degraded to be used by the Access Navigator.

4. Verify that Access Navigator is using BITS clock:

Requirement: Primary Clock Source is BITS

Requirement: Primary Clock Status is In Service

Requirement: Secondary Clock Source is BITS

Requirement: Secondary Clock Status is In Service

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Verify Alarm Output Connections

CAUTION! **MAXIMUM RELAY CONTACT RATING IS 1 AMPERE @ 110 V AC OR DC.**

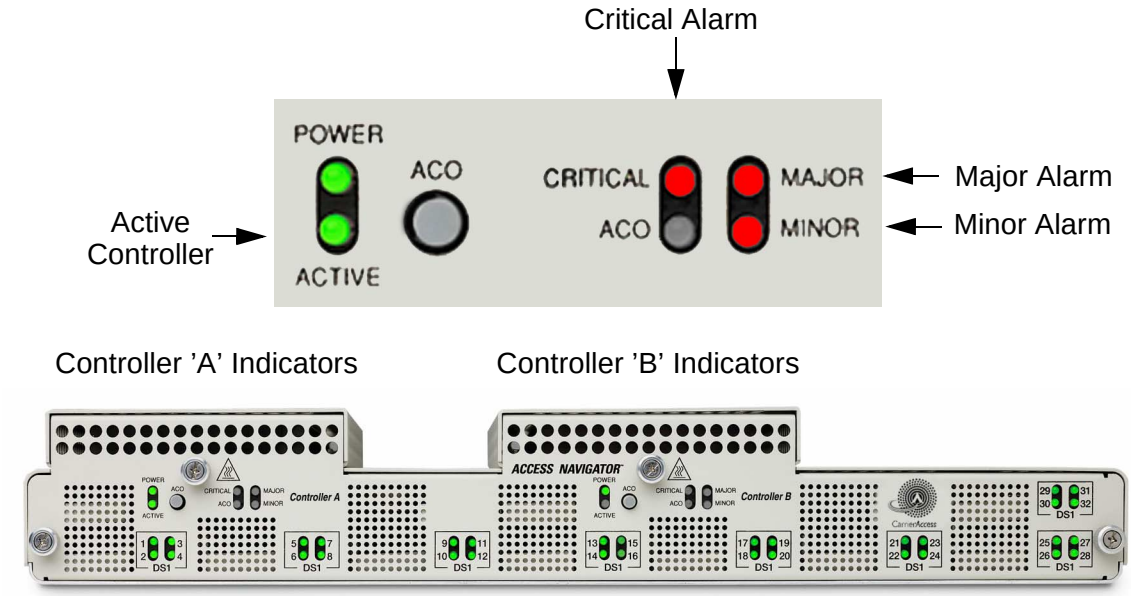

Figure 6-30. Location of Alarm Status Indicators

NOTE: If alarm indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

1. Verify critical output alarm functions as follows.
   - Enter the following command to simulate critical alarm.

     `set alarms critical on`

     Requirement: Critical alarm relay output contacts close (see Figure 6-16 on page 6-29).

     Requirement: Active Controller card Critical Alarm indicator lights (Figure 6-30).
   - Enter the following command to turn off critical alarm.

     `set alarms critical off`

     Requirement: Critical alarm relay output contacts open.

     Requirement: Active Controller card Critical Alarm indicator goes off.

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2. Verify major output alarm functions as follows.
   - Enter the following command to simulate major alarm.
     `set alarms major on`

     Requirement: Major alarm relay output contacts close (see Figure 6-16 on page 6-29).

     Requirement: Active Controller card Major Alarm indicator lights (Figure 6-30).
   - Enter the following command to turn off major alarm.
     `set alarms major off`

     Requirement: Major alarm relay output contacts open.

     Requirement: Active Controller card Major Alarm indicator goes off.
3. Verify minor output alarm functions as follows.
   - Enter the following command to simulate minor alarm.
     `set alarms minor on`

     Requirement: Minor alarm relay output contacts close (see Figure 6-16 on page 6-29).

     Requirement: Active Controller card Minor Alarm indicator lights (Figure 6-30).
   - Enter the following command to turn off minor alarm.
     `set alarms minor off`

     Requirement: Minor alarm relay output contacts open.

     Requirement: Active Controller card Minor Alarm indicator goes off.

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Verify Alarm Input Connections

NOTE: Alarm inputs produce Minor Alarm events tagged with input number. For example, Alarm Input 1 produces the CLI message “Alarm Input 1 Detected”.

Verify input alarm functions as follows:

- Momentarily short-circuit pins for each alarm input pair (l, 2, 3 in Figure 6-31) to simulate an alarm contact closure. See *Alarm Input Connections* on page 6-31.

  Requirement: Contact closure on any alarm input wire pair produces Minor Alarm indication on active Controller card (see Figure 6-32).

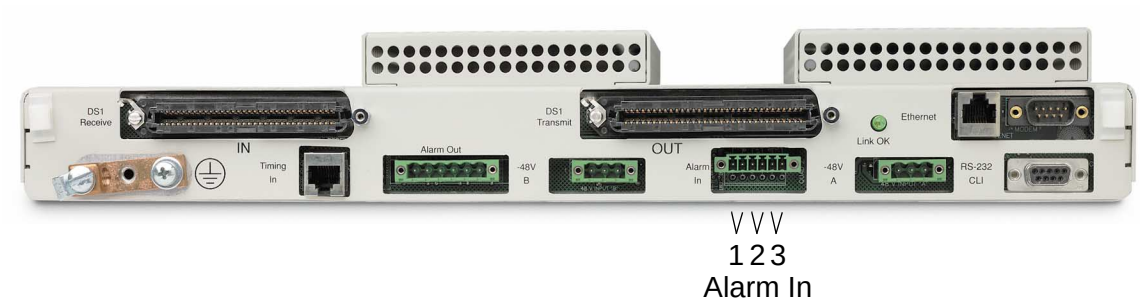

Figure 6-31. Location of Rear Panel Alarm Input Connector

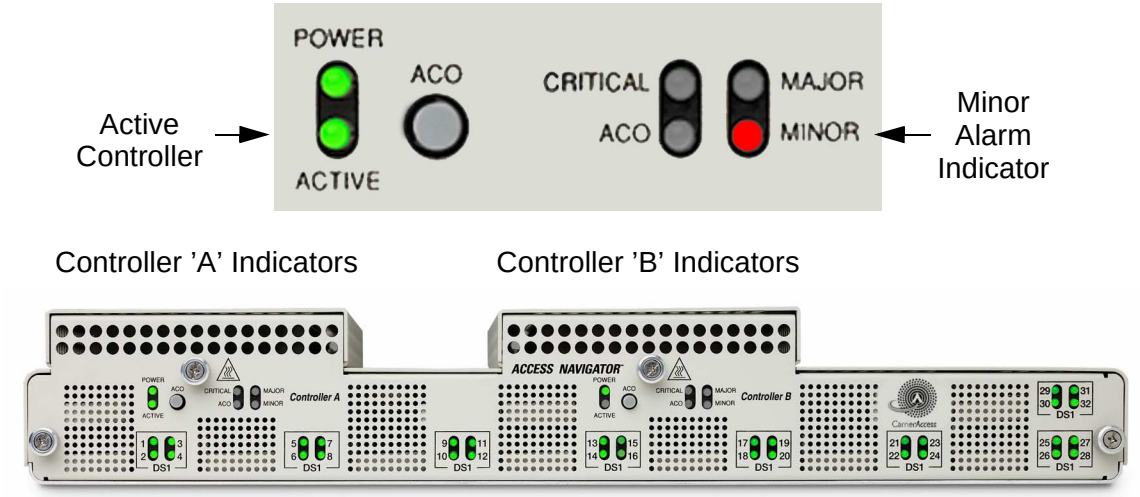

Figure 6-32. Location of Active Controller and Minor Alarm Indicators

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

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Exit Management Session

NOTE: You will remain logged into the Access Navigator until you use the `exit` command.

When you are finished with the management session, you must log out and exit from the Access Navigator by entering the following command:

```
exit
```


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Install Redundant Controller Card

This procedure provides steps for installing a second, redundant Controller card to provide electronics and power supply protection. Steps are also included to very operation after installation. Controller cards are hot swappable and can be installed at any time, without interrupting service.

Installation Summary

- Precautions ... 6-49
- Tools and Materials ... 6-50
- Verify Software Compatibility ... 6-50
- Remove Front Cover ... 6-51
- Install Controller Card ... 6-52
- Verify Operation ... 6-53
- Replace Front Cover ... 6-54

Precautions

DANGER! **BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.**

CAUTION! **SERVICE DISRUPTIONS MAY OCCUR IF TWO CONTROLLER CARDS ARE INSTALLED WITH INCOMPATIBLE SOFTWARE, SUCH AS ONE DCS CARD AND ONE GR-303 CARD. IF THE SOFTWARE IS NOT COMPATIBLE, DO NOT SWITCH NEW CONTROLLER INTO ACTIVE MODE – REMOVE CARD AND RETURN TO REPAIR FACILITY. IF DESIRED, YOU CAN UPGRADE THE NEW CARD TO MAKE THE SOFTWARE COMPATIBLE (SEE _UPDATE CONTROLLER CARD SOFTWARE_ ON page 17-1).**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE _STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES_ ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

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Tools and Materials

Obtain the following tools and materials.

- Office records for installation site
- Grounding wrist strap
- Controller card

Verify Software Compatibility

CAUTION! **SERVICE DISRUPTIONS MAY OCCUR IF TWO CONTROLLER CARDS ARE INSTALLED WITH INCOMPATIBLE SOFTWARE, SUCH AS ONE DCS CARD AND ONE GR-303 CARD. IF THE SOFTWARE IS NOT COMPATIBLE, DO NOT SWITCH NEW CONTROLLER INTO ACTIVE MODE – REMOVE CARD AND RETURN TO REPAIR FACILITY. IF DESIRED, YOU CAN UPGRADE THE NEW CARD TO MAKE THE SOFTWARE COMPATIBLE (SEE *UPDATE CONTROLLER CARD SOFTWARE* ON page 17-1).**

NOTE: This procedure assumes that the existing Controller is in card slot A and that the redundant Controller will be installed in card slot B. If this is not true, reverse the A and B designations in the following steps.

1. If not currently logged into the Access Navigator, initiate an RS-232 management session (see *Start RS-232 Management Session* on page 7-6).
2. Display version of installed Controller card software by entering the following command:

   ```
   status equipment
   ```

   A message similar to the following will appear.

   ```
   Equipment    Status              Version
   ---------    ------              -------
   Controller A Active              01.72
   Controller B Card not installed
   ```

3. Is version of installed Controller card compatible with redundant Controller card to be installed?

   If YES, go to next step.

   If NO, do NOT continue this procedure. Software is not compatible. See **CAUTION** above.

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Remove Front Cover

DANGER! **BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

1. Put on grounding wrist strap and follow anti-static procedures.
2. Loosen captive thumbscrews on front cover (see Figure 6-33).
3. Remove front cover and set aside.

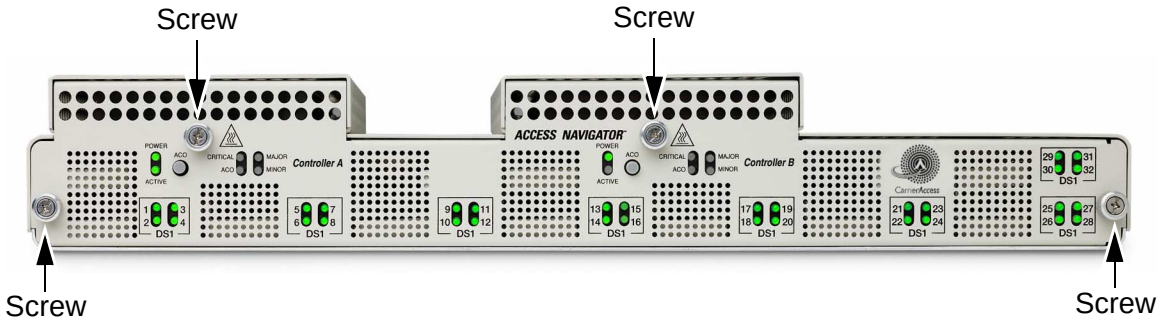

Figure 6-33. Location of Front Panel Cover Screws

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Install Controller Card

1. Locate Controller B card slot (see Figure 6-34).
2. Straighten card ejector latches (see Figure 6-35), position Controller card in guide rails, and carefully slide card into slot.
3. Press card ejector latches in toward center of card until card connector mates with backplane connector.

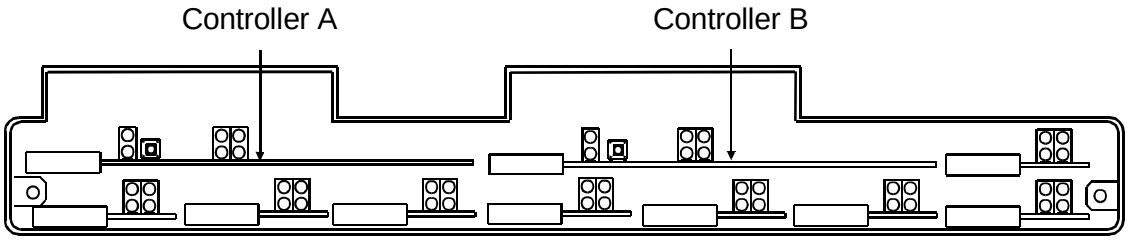

Figure 6-34. Location of Controller Cards

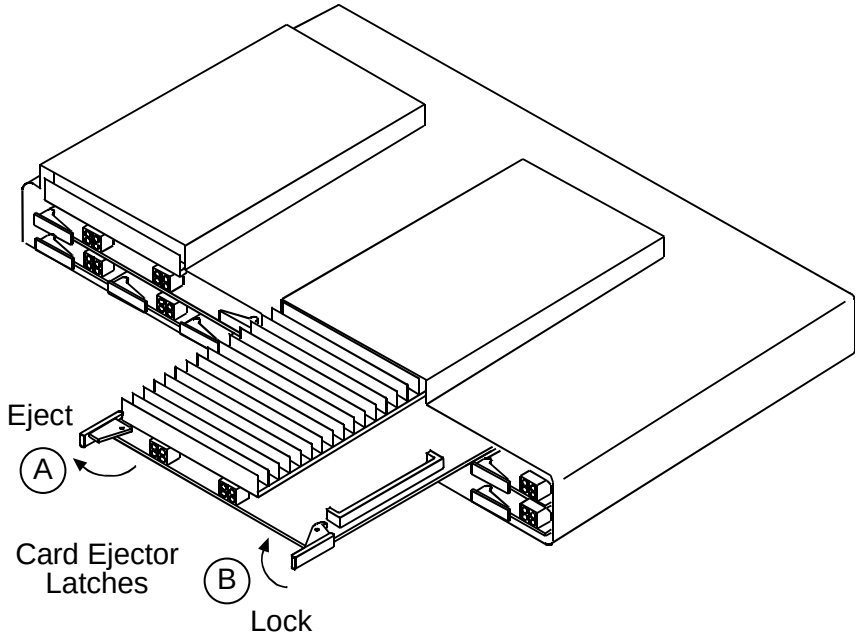

Figure 6-35. Installing Controller Card

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Verify Operation

1. Wait two minutes for new Controller card to learn system settings.

NOTE: Controller's POWER indicator will light yellow while it is booting up.

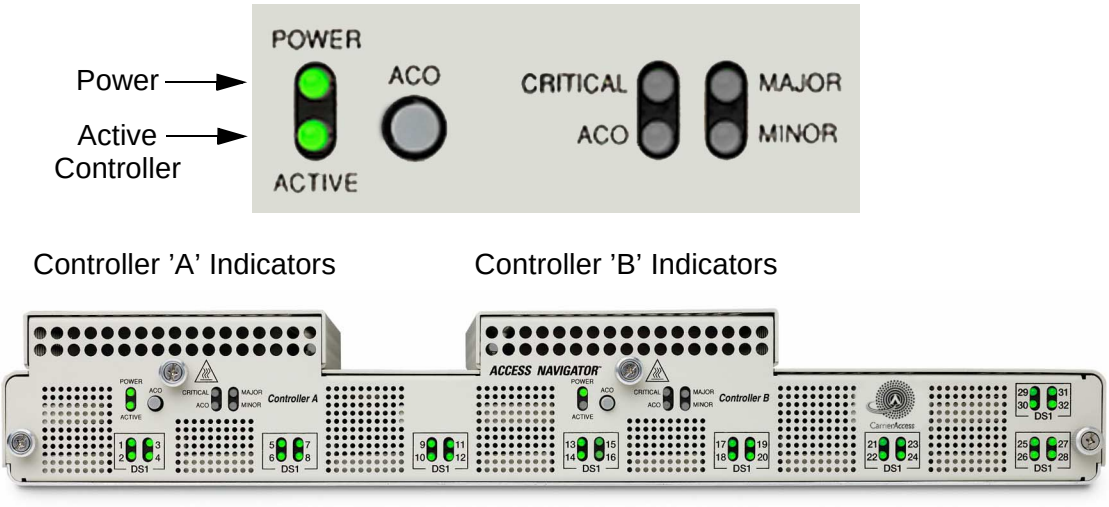

Figure 6-36. Front Panel Indicators

2. Verify that status indicators show Controller B is in standby.

   Requirement: CONTROLLER A POWER indicator lights green.

   Requirement: CONTROLLER B POWER indicator lights green.

   Requirement: CONTROLLER A ACTIVE/STANDBY indicator lights green.

   Requirement: CONTROLLER B ACTIVE/STANDBY indicator is off.

3. Display version of newly installed redundant Controller card by entering the following command:

   `status equipment`

   A message similar to the following will appear.

```
Equipment      Status              Version
---------      ------              -------
Controller A   Active              01.70
Controller B   Standby             01.70
```

4. Is version of active Controller card compatible with standby Controller card just installed?

   If YES, go to next step.

   If NO, go to Step 8. (See CAUTION above.)

5. Put Controller B in active mode by entering following command:

   `switch controller`

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6. Verify that status indicators now show Controller B is active.

   Requirement: CONTROLLER A POWER indicator lights green.

   Requirement: CONTROLLER B POWER indicator lights green.

   Requirement: CONTROLLER A ACTIVE/STANDBY indicator is off.

   Requirement: CONTROLLER B ACTIVE/STANDBY indicator lights green.

7. Verify that Controller B is now in active mode by entering following command:

   `status equipment`

   Requirement: Equipment status display shows Controller B is in Active mode.

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

8. When you are finished with the management session, you must log out and exit from the Access Navigator by entering the following command:

   `exit`

Replace Front Cover

DANGER! **FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.**

Replace front cover and tighten screws.

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Install Additional Quad T1 Framer Cards

This procedure provides steps for installing additional Quad T1 Framer (QF) cards to increase DS1 service capacity. Steps are also included to very operation after installation. The Access Navigator can hold up to eight QF cards, providing a total of 32 DS1 circuits. QF cards are hot swappable and can be installed at any time, without interrupting service on other cards.

Installation Summary

- Precautions ... 6-55
- Tools and Materials ... 6-55
- Remove Front Cover ... 6-56
- Install Quad T1 Framer Card ... 6-57
- Verify Operation ... 6-59
- Replace Front Cover ... 6-61

Precautions

DANGER! **BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

Tools and Materials

Obtain the following tools and materials.

- Office records for installation site
- Grounding wrist strap

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Remove Front Cover

DANGER! **BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

1. Put on grounding wrist strap and follow anti-static procedures.
2. Loosen captive thumbscrews on front cover (see Figure 6-37).
3. Remove front cover and set aside.

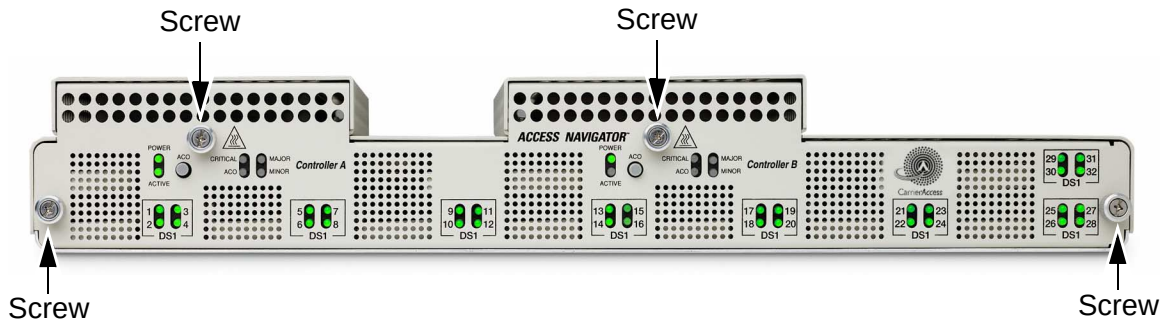

Figure 6-37. Location of Front Panel Cover Screws

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Install Quad T1 Framer Card

NOTE: Quad T1 Framer (QF) cards are typically installed in sequential order, from 1 to 8. Locate next available Quad T1 Framer card slot (see Figure 6-38).Figure 6-39 shows installation of QF card #6.

1. Locate card slot in which to install Quad T1 Framer card (see Figure 6-38).

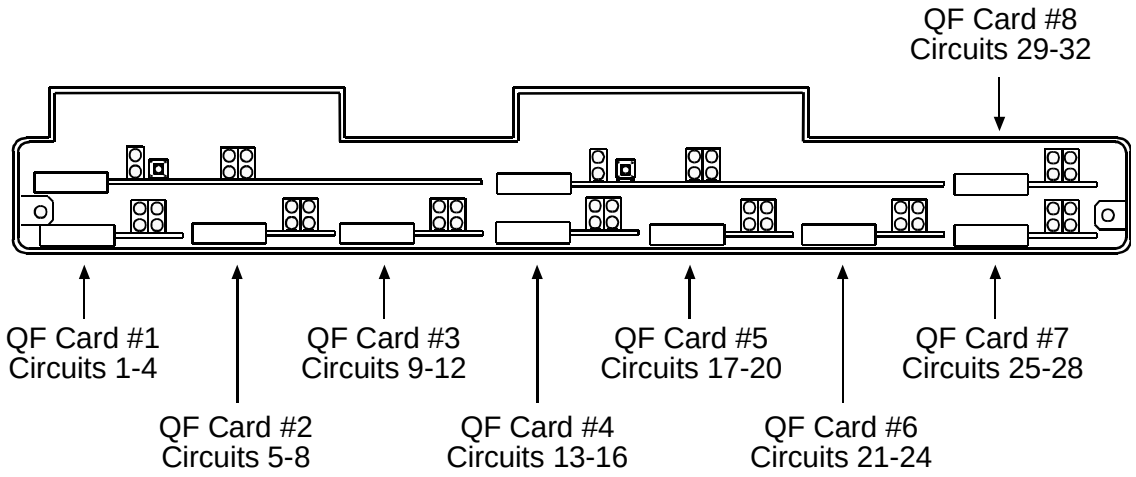

Figure 6-38. Location of Quad T1 Framer Cards

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2. Remove new QF card from antistatic wrapper and straighten card ejector latch (see A in Figure 6-39).
3. Position new QF card in guide rails and carefully slide into slot until it mates with backplane connector.
4. Press card ejector latch in toward center of card (see B in Figure 6-39) to secure card in card slot.

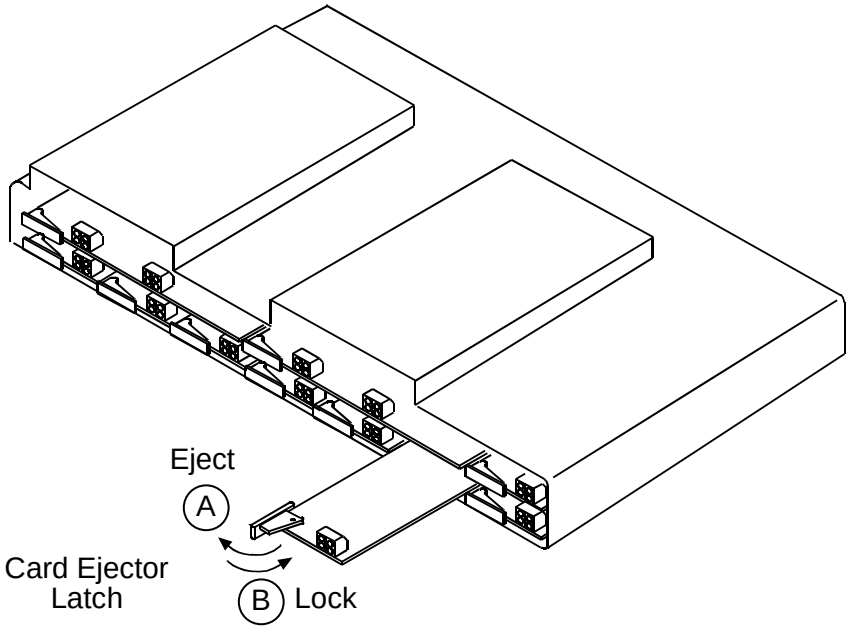

Figure 6-39. Installing Quad T1 Framer Card

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Verify Operation

NOTE: Verification requires a temporary loopback between the DS1 transmit and receive signals by cross-connecting newly installed DS1s at the patch panel.

1. If not currently logged into the Access Navigator, start an RS-232 management session (*Start RS-232 Management Session* on page 7-6).
2. Display equipment status of Quad T1 Framer card with the following command:

   `status equipment`

   A message similar to the following will appear.

```
Equipment      Status              Version
---------      ------              -------
Controller A   Active              01.70
Controller B   Standby             01.70
DS1 Card 1     Installed            1
DS1 Card 2     Installed            1
DS1 Card 3     Installed            1
DS1 Card 4     Installed            1
DS1 Card 5     Installed            1
DS1 Card 6     Installed            1
DS1 Card 7     Card not installed
DS1 Card 8     Card not installed
```

   Requirement: Equipment status shows DS1 card is installed.

NOTE: If status display shows that the card is not installed, check that the card is properly seated in the card connector.

3. Set DS1s on Quad T1 Framer card in service by entering the following command, where <n> is the DS1 number or range of DS1 numbers:

   `set ds1 <n> up`

   Example: set ds1 9 up

   Example: set ds1 9-12 up

4. Loop back newly installed DS1 transmit outputs to DS1 receive inputs at patch panel.

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5. Verify the following front panel status indications (see Figure 6-40).

   Requirement: DS1 status indicators will blink yellow for 10 to 15 seconds and then light green when frame synchronization is established. (Indicators will not light if DS1s are set out of service.)

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

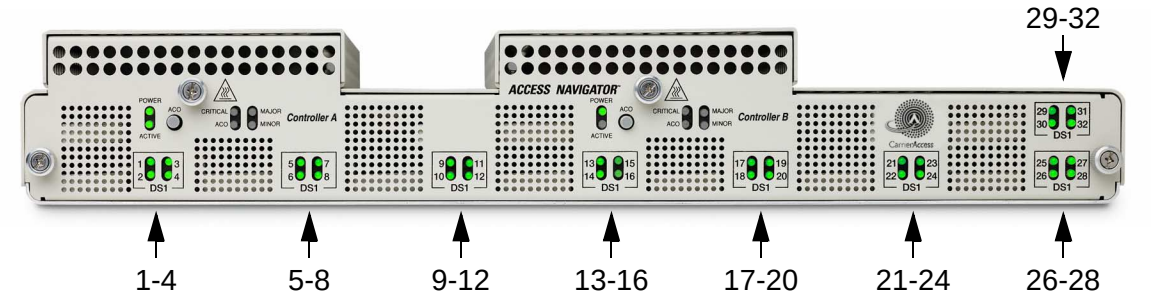

Figure 6-40. Location of DS1 Status Indicators

6. Display status of DS1s on Quad T1 Framer card by entering the following command:

   `status ds1` <n>

   A message similar to the following will appear for each DS1.

```
Status for DS1 1:
    Receive:                Traffic
    Transmit:               Traffic
```

   Requirement: DS1 status display shows Traffic in receive and transmit directions.

7. Remove DS1 loop back at patch panel.
8. If required, set DS1s on Quad T1 Framer card out of service by entering the following command, where <n> is the DS1 number or range of DS1 numbers:

   `set ds1` <n> **`down`**

   Example: set ds1 9 down

   Example: set ds1 9-12 down

9. End management session by entering following command:

   `exit`

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Replace Front Cover

DANGER! FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.

Replace front cover and tighten screws.

Configure Management Interfaces

This procedure provides steps for setting up the RS-232 and Ethernet interface configurations for remote management by CLI, Telnet, SNMP, Valet™ and NetworkValet™ EMS software

Setup Summary

- Start RS-232 Management Session ... 6-62
- Set Date ... 6-63
- Set Time ... 6-63
- Set System ID or CLLI code ... 6-64
- Set IP Address and Subnet Mask ... 6-64
- Set Gateway Address ... 6-65
- Verify Ethernet Management Connection ... 6-43
- Exit Management Session ... 6-65

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Start RS-232 Management Session

NOTE: Security – No names or passwords are required for new installation and initial turn up. The Access Navigator will accept any user, until password security is turned on.

NOTE: Command Line Interface – The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages. See *Command Line Interface Conventions* on page 7-3 for a short description of the conventions used in this manual to represent management commands, settings, and messages. For additional information, see *CLI Language Reference* on page 18-1.

1. Configure computer terminal emulation software, or craft terminal, as follows:
   - Terminal emulation: ANSI, ASCII, VT100
   - Flow control: None
   - Send mode: echo characters locally
   - Baud rate: 9600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1

NOTE: In the following step, it is only important that the Access Navigator respond with a message. A typical message includes the name of the unit, the time and date, and a prompt.

2. Initiate RS-232 management session by pressing keyboard Enter or Return key.

```
Carrier Access Corporation Access Navigator

08:30:45 01/30/1999

Access Navigator>
```

   Requirement: Access Navigator message appears on computer or craft terminal display.

NOTE: If there is no response from the Access Navigator, refer to *Diagnostics & Troubleshooting* on page 15-1.

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Set Date

NOTE: Date format is month/day/year with slashes to separate the digits, as in 01/30/1999.

1. Set current date by entering the following command:

   `set date` *<mm/dd/yyyy>*

   Example: set date 01/30/2001

2. Show and verify date setting by entering the following command:

   `show date`

   Requirement: Access Navigator responds with correct date.

Set Time

NOTE: Time format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.

1. Set current time by entering the following command:

   `set time` *<hh:mm:ss>*

   Example: set time 08:30:45

   The time will be updated when you press the Enter or Return key and the Access Navigator receives the command.

2. Show and verify time setting by entering the following command:

   `show time`

   Requirement: Access Navigator responds with correct time.

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Set System ID or CLLI code

NOTE: The System Identifier (name, location, or Telcordia CLLI code) is a text string, such as “Acme Corp. AN#2” or “DNVRCO1A201”. The identifier can be up to 20 characters long, and may use any combination of letters and numbers. The identifier must be enclosed in quote marks. The System Identifier also appears in the command line prompt. The default System Identifier is “Access Navigator” so the command prompt will be “Access Navigator>”. When you change the identifier, the prompt will also change.

1. Set System ID by entering the following command:

   `set id` *<"id">*

   Example: set id "DNVRCO1A201"

2. Show and verify current ID setting by entering the following command:

   `show id`

   Requirement: Access Navigator responds with correct System Identifier.

Set IP Address and Subnet Mask

NOTE: An RS-232 management connection must be used to set up the Ethernet port for remote management by Telnet, SNMP, Valet™ or NetworkValet™ EMS software.

NOTE: IP Address – Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type none for the IP address.

NOTE: Subnet Mask – The Access Navigator uses a subnet mask to identify the permissible range of IP addresses on the local network. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Addresses outside the subnetwork will be sent to the Gateway address. Subnet masks have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *255.255.0.0* and *255.255.255.0*. If a subnet mask is not used, type none or leave blank.

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Set the Ethernet IP address and mask by typing the following line after the prompt, then press the Enter or Return key.

`set ethernet ip address` *`<address> <mask>`*

Example: set Ethernet address 192.168.118.65 255.255.255.0

To turn off Ethernet interface, enter

`set ethernet ip address none`

To display current settings, enter

`show ip`

Requirement: Access Navigator responds with correct IP address.

Set Gateway Address

NOTE: Gateway Address – A gateway is any device that passes packets from one network to another network in their trip across the Internet. Gateway addresses have the same format as IP addresses. If a gateway address is not used, you must enter `none` for the gateway address.

Set the gateway IP address by typing the following line after the prompt, then press the Enter or Return key.

`set ip gateway <address>`

If the gateway address is not used, enter

`set ip gateway none`

To display current settings, enter

`show ip`

Requirement: Access Navigator responds with correct gateway IP address.

Exit Management Session

NOTE: You will remain logged into the Access Navigator until you use the `exit` command.

When you are finished with the management session, you must log out and exit from the Access Navigator by entering the following command:

`exit`

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CHAPTER 7

Start Management Session

In this Chapter

- Management Requirements ... 7-2
- Command Line Interface Conventions ... 7-3
- RS-232 Management ... 7-4
- Telnet Management ... 7-8
- NetworkValet EMS and Valet Management ... 7-11

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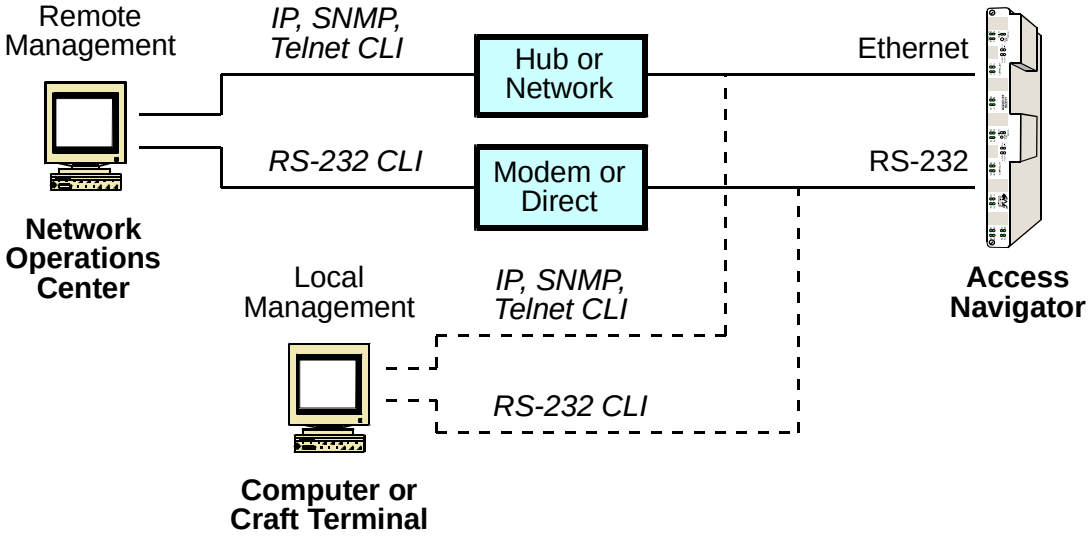
Management Requirements

NOTE: Password Security – No user names or passwords are required for installation and initial turn up until user and password security is activated.

Provisioning requires RS-232 or Ethernet connections to the Access Navigator. The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages. CLI is used with both RS-232 terminal programs and Telnet.



NOTE: RS-232 and Ethernet Connections are normally made during installation (see*RS-232 Management Connection* on page 6-17 and *Ethernet Management Connection* on page 6-22).

- **RS-232 CLI Management** requires an RS-232 connection to the Access Navigator.
- **Telnet CLI Management** requires an Ethernet connection to the Access Navigator. The Ethernet function can only be turned up through the RS-232 management interface.
- **SNMP Management** requires an Ethernet connection to the Access Navigator. The SNMP function can only be turned up through the RS-232 or Telnet management interface.
- **Valet™ and NetworkValet™ EMS** require an Ethernet connection to the Access Navigator. Valet and NetworkValet EMS are Carrier Access element management software products that provide an easy-to-use graphical user interface.

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Command Line Interface Conventions

> **NOTE:** To obtain online help, type the word **help** and press the Enter or Return key, or type a question mark **?** after any partial command. For help features, see *Online Help* on page 18-10. For detailed CLI information, see *CLI Language Reference* on page 18-1.

The Access Navigator control interface uses a Command Line Interface (CLI) language. Procedures in this manual use the following conventions to represent input commands and output messages:

- Input commands appear in a bold typewriter font, as in the following example:

  `set ds1 1-4 up`

- If a command requires the operator to enter information, an italic typewriter font is used to show what item or items are required. Each item will be enclosed in < and > symbols, as in the following example. Do not type the < > symbols:

  `set ds1` *`<n> <setting>`*

- If the operator must enter one item from a list, the items will be separated by vertical lines, as in the following example. Do not type the < | > symbols:

  `set ds1` *`<n> <up|down>`*

- System output messages to the operator are printed in normal typewriter font, as in the following response to show the settings for DS1 number 13:

  `show ds1 13`

```
Settings for DS1 13:
     Circuit ID:            Acme Corporation
     Up/Down:               UP
     Framing:               ESF
     Line Coding:           B8ZS
     Type:                  DROP
     Clock Source:          NORMAL
     Line Build Out:        DSX-1 PULSE FOR 0-133 ft.
```


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RS-232 Management

RS-232 Management Requirements

A permanent RS-232 connection is normally made during installation (see *RS-232 Management Connection* on page 6-17). However, a temporary cable connection can be made at any time to the Access Navigator's RS-232 CLI port to start a management session using a craft terminal or computer with terminal emulation software.

The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages. See *Command Line Interface Conventions* on page 7-3 for a short description of the conventions used in this manual to represent management commands, settings, and messages. For detailed information, see *CLI Language Reference* on page 18-1.

Procedure Summary

- Obtain Information ... 7-5
- Connect RS-232 Cable to Access Navigator ... 7-5
- Set Up Terminal Program ... 7-5
- Start RS-232 Management Session ... 7-6
- Perform Management Operations ... 7-7
- Exit RS-232 Management Session ... 7-7

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Obtain Information

NOTE: User names and passwords are not required until security features are activated.

Obtain office records with the following information:

- User name (if required)
- Password (if required)

Connect RS-232 Cable to Access Navigator

1. If you already have an RS-232 cable connection to the Access Navigator, go to step Step
2. Connect RS-232 DCE-to-DTE cable with 9-pin DE9 (DB9) connector on one end to RS-232 CLI management connector on rear panel of Access Navigator (see Figure 7-1).
3. Connect other end of RS-232 cable to computer or craft terminal.

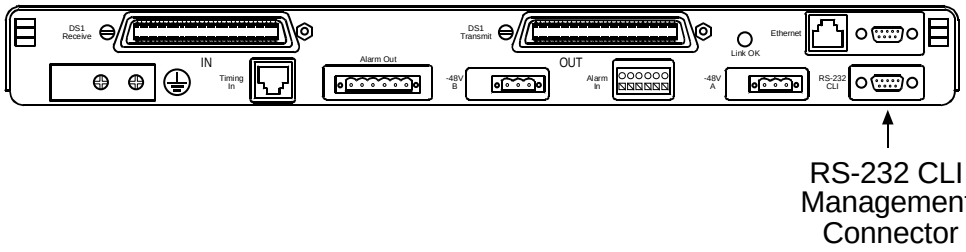

Figure 7-1. Location of RS-232 CLI Connector

Set Up Terminal Program

Configure computer terminal emulation software, or craft terminal, as follows:

- Terminal emulation: ANSI, ASCII, or VT100
- Flow control: None
- Send mode: Echo characters locally
- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1

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Start RS-232 Management Session

1. Start management session by pressing keyboard Enter or Return key.

NOTE: When a management session is started, the Access Navigator will either request a user login name or display a command prompt.

A "Login:" request indicates that security features have been activated. The operator must enter a valid user name in order to proceed any further. A user password may also be required. Whenever a login name or password is rejected, the system will repeat the request.

If no "Login:" request appears, the user has Level 1 access to all commands. This is normal for the first management session after installation.

Command prompts always end with the symbol ">". The default command prompt is Access Navigator>. The command prompt indicates that the system is waiting for the operator to enter the next command. However, if the previous command was rejected, an error message will appear immediately above the prompt to describe the error or show the position of the first rejected word or value in the command.

2. If a "Login:" message similar to the following appears, enter you user name and press Enter or Return key. If a "Password:" message appears next, enter your password and press Enter or Return key.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login:
```

3. If a message and command prompt similar to the following appears, you are successfully logged in to the Access Navigator.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Access Navigator>
```


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Perform Management Operations

After logging on, perform whatever management operations are required by the installation, provisioning, or maintenance procedure. For detailed command descriptions, see *CLI Language Reference* on page 18-1.

Exit RS-232 Management Session

NOTE: You will remain logged into the Access Navigator until you use the `exit` command.

When you are finished with the management session, you must log out and exit from the Access Navigator by entering the following command:

```
exit
```


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Telnet Management

Telnet Management Requirements

Telnet requires an Ethernet connection to the Access Navigator, which is normally made during installation (see *Ethernet Management Connection* on page 6-22). The Ethernet function can only be turned on through the RS-232 management interface.

The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages. See *Command Line Interface Conventions* on page 7-3 for a short description of the conventions used in this manual to represent management commands, settings, and messages. For detailed information, see *CLI Language Reference* on page 18-1.

NOTE: You will remain logged into the Access Navigator until you terminate the management session by using the `exit` command. If you do not terminate the session before disconnecting from the Telnet server, the Access Navigator Telnet session will remain active for 2 hours. No other users will be able to log on if all Telnet sessions are active.

Procedure Summary

- Obtain Information ... 7-9
- Start Telnet Program and Connect to Access Navigator ... 7-9
- Start Telnet Management Session ... 7-9
- Perform Management Operations ... 7-10
- Exit Telnet Management Session When Finished ... 7-10

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Obtain Information

NOTE: User names and passwords are not required until security features are activated.

Obtain office records with the following information:

- IP address for Access Navigator
- User name (if required)
- Password (if required)

Start Telnet Program and Connect to Access Navigator

1. Start up Telnet program on management station.
2. Connect to IP address of Access Navigator.
3. Wait for Telnet connection to be established.

NOTE: If you are having difficulty establishing a Telnet connection, try using the Ping command to verify that there is a working IP network connection path between your computer terminal and the Access Navigator.

Start Telnet Management Session

1. Start Telnet management session by pressing the Enter or Return key.

NOTE: When a management session is started, the Access Navigator will either request a user login name or display a command prompt.

A "Login:" request indicates that security features have been activated. The operator must enter a valid user name in order to proceed any further. A user password may also be required. Whenever a login name or password is rejected, the system will repeat the request.

If no "Login:" request appears, the user has Level 1 access to all commands. This is normal for the first management session after installation.

Command prompts always end with the symbol ">". The default command prompt is Access Navigator>. The command prompt indicates that the system is waiting for the operator to enter the next command. However, if the previous command was rejected, an error message will appear immediately above the prompt to describe the error or show the position of the first rejected word or value in the command.

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2. If a “Login:” message similar to the following appears, enter you user name and press Enter or Return key. If a “Password:” message appears next, enter your password and press Enter or Return key.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login:
```

3. If a message and command prompt similar to the following appears, you are successfully logged in to the Access Navigator.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Access Navigator>
```

Perform Management Operations

After logging on, perform whatever management operations are required by the installation, provisioning, or maintenance procedure. For detailed command descriptions, see *CLI Language Reference* on page 18-1.

Exit Telnet Management Session When Finished

NOTE: You will remain logged into the Access Navigator until you terminate the session by using the `exit` command. If you do not terminate the session before disconnecting for the Telnet server, the Access Navigator Telnet session will remain active for 2 hours. No other users will be able to log on if all Telnet sessions are active.

When you are finished with the management session, you must log out and exit from the Access Navigator by entering the following command:

```
exit
```


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NetworkValet EMS and Valet Management

Refer to *NetworkValet EMS User Manual* or *Valet User Manual* for operating instructions.

NetworkValet and Valet are element management systems with simple graphical user interfaces. Valet is ideal for technicians deploying Access Navigators in carrier networks, while the full-featured NetworkValet EMS is an enhanced management system with alarms and performance monitoring is intended for Network Operations Centers (NOCs).

NetworkValet and Valet provide easy management of Carrier Access products including the Access Navigator and Adit 600. Valet and NetworkValet are cross-platform Java applications that run on either Microsoft Windows and Solaris based computer systems. Java Runtime Engine (JRE) software for Windows or Solaris is included with the Valet and NetworkValet installation programs.

NetworkValet and Valet send commands over the carrier's IP network to communicate with the SNMP agent in the Access Navigator. The Access Navigator includes a standard 10Base-T Ethernet port for connection to the hub or network interface, or laptop computer. The Access Navigator must have FLASH software version 1.7 or higher to support IP DS0 management of remote Adit 600 terminals.

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CHAPTER 8

Provision Access Navigator

In this Chapter

- Basic Provisioning Overview ... 8-2
- Basic Provisioning Quick Guide ... 8-2
- Obtain Provisioning Information ... 8-3
- Verify System Equipment Configuration ... 8-4
- Set System ID or CLLI Code ... 8-5
- Set Date ... 8-6
- Set Time ... 8-6
- Set Ethernet Properties ... 8-7
- Set User and Password Security ... 8-9
- Set SNMP Properties ... 8-11

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Basic Provisioning Overview

This procedure covers provisioning of basic Access Navigator settings including the System ID, date, time, password security, and the Ethernet and SNMP interfaces. These basic settings are required for management of the Access Navigator by RS-232, Telnet, SNMP, and element management programs such as Valet™ and NetworkValet™ EMS.

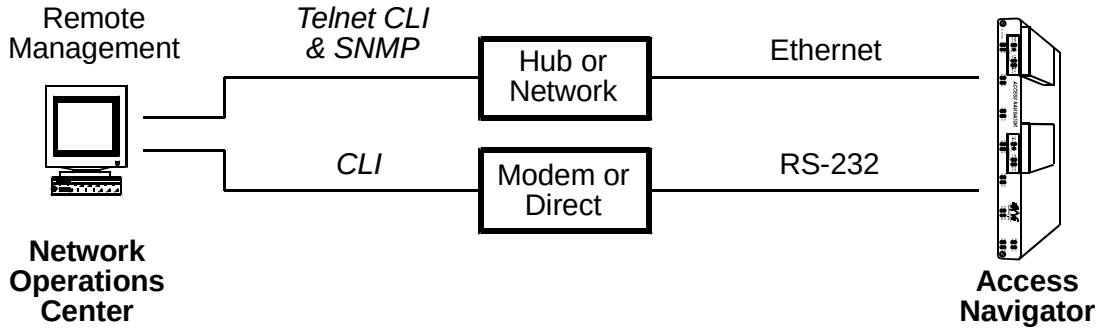

Figure 8-1 Access Navigator Management Architecture

Basic Provisioning Quick Guide

Basic provisioning involves setting up the Access Navigator for network operation and remote management. Basic provisioning includes the following items.

CLI Commands	Descriptions
status equipment	Verify system configuration.
set id <*"id"*>	System Identifier or CLLI code.
set date <*mm/dd/yyyy*>	Date with four-digit year.
set time <*hh:mm:ss*>	Time with 24-hour clock.
set ethernet ip address none **set ethernet ip address** <*address*> <*mask*> **set ip gateway** <*address*>	Disable Ethernet interface if not used. Enable Ethernet interface. IP gateway address.
add user <*name*> **set user** <*name*> **level** <*access*> **set user** <*name*> **password** **delete user** <*name*>	Add user name. Access level. Password. Remove user.

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Obtain Provisioning Information

Obtain the following information (as needed):

- Office records for installation site
- System Name or CLLI code
- Ethernet IP address
- Ethernet Subnet mask
- Gateway address
- User names and passwords
- SNMP System Name or CLLI code
- SNMP System Location
- SNMP System Contact
- SNMP Get-Community string
- SNMP Set-Community string
- SNMP Trap-Community string
- SNMP Trap NMS Recipients (up to three IP addresses)

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Verify System Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

NOTE: Telnet management sessions require use of the Ethernet interface, which can only be provisioned through an RS-232 management session.

1. Start management session (see *Start Management Session* on page 7-1).
2. Show system equipment configuration with the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status                Version
---------        ------                -------
Controller A     Active                01.00
Controller B     Standby               01.00
DS1 Card 1       Installed              1
DS1 Card 2       Installed              1
DS1 Card 3       Installed              1
DS1 Card 4       Installed              1
DS1 Card 5       Installed              1
DS1 Card 6       Installed              1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

3. Compare status message to office records to verify system configuration. If there is a discrepancy, follow standard practices to resolve problem.

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Set System ID or CLLI Code

NOTE: The System Identifier (name, location, or Telcordia CLLI code) is a text string, such as “Acme Corp AN#2” or “DNVRCO1A201”. The identifier can be up to 20 characters long, and may use any combination of letters and numbers. The identifier must be enclosed in quote marks.

NOTE: The System Identifier also appears in the command line prompt. The default System Identifier is “Access Navigator” so the command prompt will be “Access Navigator>”. When you change the identifier, the prompt will also change. (If other management sessions are in progress, the operators will not see the new prompt until they start a new session.)

1. Show current System Identifier with the following command:

   `show id`
2. If System Identifier is correct, skip remaining steps.
3. Set System Identifier with the following command:

   `set id` *`<"id">`*

   Example: set id "DNVRCO1A201"

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Set Date

NOTE: Date format is month/day/year with slashes to separate the digits, as in 01/30/1999.

1. Show current date setting with the following command:

   `show date`
2. If date setting is correct, skip remaining steps.
3. Set correct date with the following command:

   `set date` *<mm/dd/yyyy>*

   Example: set date 01/30/1999

Set Time

NOTE: Time format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.

1. Show current time setting with the following command:

   `show time`
2. If time setting is correct, skip remaining steps.
3. Set correct time with the following command:

   `set time` *<hh:mm:ss>*

   Example: set time 08:30:45

   The time will be updated when you press the Enter or Return key and the Access Navigator receives the command.

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Set Ethernet Properties

NOTE: Ethernet is required for Telnet, SNMP, and NetworkValet™ EMS. Ethernet functions can only be provisioned through an RS-232 management session. If you are not going to use the Ethernet port, do not make any connections to it.

1. Show current Ethernet IP settings with the following command:

   `show ip`

   The following is a typical message:

```
IP Address and Mask:     192.168.0.233 255.255.255.0
IP Address of Gateway    192.168.0.250
```

NOTE: IP Address – Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type none for the IP address.

NOTE: Subnet Mask – The Access Navigator uses a subnet mask to identify the permissible range of IP addresses on the local network. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Addresses outside the subnetwork will be directed to the Gateway address. Subnet masks have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *255.255.0.0* and *255.255.255.0*. If a subnet mask is not used, type none or leave blank.

NOTE: Gateway Address – A gateway is any device that passes packets from one network to another network in their trip across the Internet. Gateway addresses have the same format as IP addresses. If a gateway address is not used, you must enter none for the gateway address.

NOTE: MAC Address – The Ethernet media access control (MAC) address is fixed by hardware and can not be changed. You can use the `show ethernet` command to display the MAC address, a hexadecimal number such as *00-E0-97-AB-CD-EF*, as well as the Ethernet IP address and mask.

2. If Ethernet settings are correct, skip remaining steps.

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3. If IP address or subnet mask is not correct, enter the following command:

   `set ethernet ip address` *<address> <mask>*

   Example: set Ethernet address 192.168.118.65 255.255.255.0

   To turn off Ethernet interface, enter

   `set ethernet ip address none`

4. If gateway IP address is not correct, enter the following command:

   `set ip gateway` *<address>*

   Example: set ip gateway 192.168.118.65

   If there is no gateway address, enter

   `set ip gateway none`

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Set User and Password Security

NOTE: Level 1 users (managers) have access to all commands. Level 2 users have access to all commands except add/delete/set user, but they can change their own password. Level 3 users can only display system status and reports, and they can change their own password.

1. Show current user settings with the following command:

   `show users`

   The following is a typical message:

```
User         Level  Last Login
----         -----  ----------
Alice        1      09:28:37 11/23/1998
Bill         1      14:06:25 11/17/1998
CarlSmith    2      11:17:45 11/22/1998
Dave46       3      12:14:33 11/20/1998
```

2. If user settings correct are correct, skip remaining steps.

NOTE: User names can be up to 10 characters long, and may use any combination of letters and numbers. Spaces and special characters are not allowed.

3. Add new user names with the following command:

   `add user` *<name>*

   Example: add user Alice

NOTE: All users have Level 1 access (highest) unless changed to a lower access level.

4. Set user access levels and passwords with the following command:

   `set user` *<name>* **`level`** *<access>*

   Example: set user Alice level 2

   The settings are as follows:

Setting	Definition
1	Set the user to access level 1 (highest).
2	Set the user to access level 2.
3	Set the user to access level 3 (lowest).

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NOTE: Passwords are optional. Passwords can be up to 10 characters long and may use any combination of letters and numbers. Spaces and special characters are not allowed. Passwords are also case sensitive, so that upper and lower case letters are different.

5. Set user passwords with the following command:

   `set user` *<name>* **`password`**

   Example: set user Alice password

   The system will prompt you to enter a new password twice for verification. To ensure security, password characters are displayed as asterisks.

   To delete a user password, so that the user has access without a password, press Enter or Return key each time the system prompts you to enter a new password.

6. Delete old user names with the following command:

   `delete user` *<name>*

   Example: delete user Bill

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Set SNMP Properties

NOTE: Settings are text strings and may use any combination of letters and numbers. Settings must be enclosed in quote marks. The System Name, Location, and Contact strings may contain up to 255 characters. Community strings may contain up to 32 characters.

1. Show current SNMP settings with the following command:

   `show snmp`

   The following is a typical message:

```
System Name:        Acme Corp AN#2
System Location:    DNVRCO1A201
System Contact:     Site Manager
GET Community:      Public
SET Community:      Public
TRAP Community:     Public
NMS #1:             192.168.0.65
NMS #2:
NMS #3:
```

2. If SNMP settings are correct, skip remaining steps.

3. Set SNMP System Name or Identification code with the following command:

   `set snmp name` *<"setting">*

   Example: set snmp name "Acme Corp AN#2"

NOTE: Telcordia (Bellcore) Common Language Location Identifier (CLLI) codes are text strings with up to 11 characters.

4. Set SNMP System Location or CLLI code with the following command:

   `set snmp location` *<"setting">*

   Example: set snmp location "DNVRCO1A201"

   Example: set snmp location "Acme Corp AN#2"

5. Set SNMP System Contact with the following command:

   `set snmp contact` *<"setting">*

   Example: set snmp contact "Site Manager"

6. Set SNMP Get-Community string with the following command:

   `set snmp getcom` *<"setting">*

   Example: set snmp getcom "Public"

7. Set SNMP Set-Community string with the following command:

   `set snmp setcom` *<"setting">*

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Example: set snmp setcom "Public"

8. Set SNMP Trap-Community string with the following command:

   `set snmp trapcom` *<"setting">*

   Example: set snmp trapcom "Public"

NOTE: SNMP trap alarm messages can be sent to three different host IP addresses. Repeat the following command to set the IP address of each recipient.

9. Set up to three SNMP NMS (network management system) trap recipients by entering their IP addresses with the following command:

   `set snmp nms` *<1|2|3> <address>*

   Example: set snmp nms 1 192.168.118.65

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CHAPTER 9

Provision DCS Service

In this Chapter

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DCS Provisioning Overview

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The Access Navigator provides full 1/0 Digital Crossconnect System (DCS) functionality. DS0s from any DS1 can be crossconnected to another DS1. This permits more efficient DS1 usage through grooming and filling DS1s, a process in which DS0s in "drop" DS1s from multiple subscriber lines are cross-connected to fill up the network "groom" DS1s.

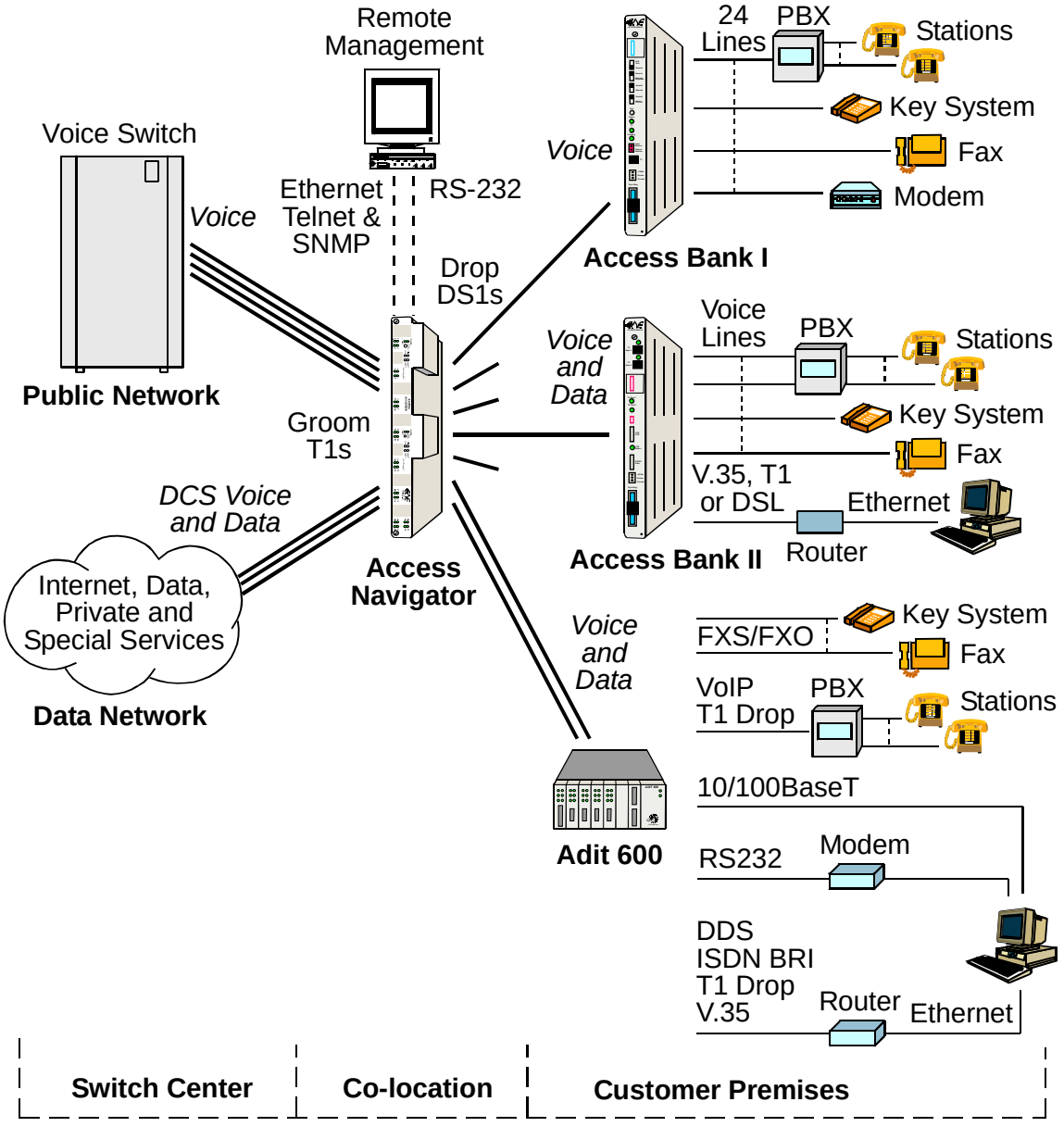

Figure 9-1 Access Navigator DCS Services

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Provisioning ISDN BRI Service

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) operates at 144,000 bits per second and is designed for desktop service. ISDN BRI is also referred to as 2B+D because it provides two Bearer channels (B1 and B2) at 64 kilobits per second, plus one D channel for signaling at 16 kilobits per second.

ISDN BRI settings and status depend on the mode.

- 3DS0 Mode transports each ISDN BRI as three DS0s, one each for the B1, B2, and D channels. These DS0s are provisioned as digital crossconnects between groom and drop DS0s. The DS0 Type must be set to Data. No special ISDN commands are used.
- 4:1 TDM Mode transports each ISDN BRI as 2.25 DS0s, one for each B channel and 0.25 for the D channel by multiplexing four D channels onto one DS0. This mode can efficiently carry 4 BRIs using only 9 DS0s. This mode works with GR-303 switch interfaces, using a fixed connection for the D channel and dynamically connecting the two B channels when needed.

The Access Navigator DCS supports ISDN BRI service (also called 2B+D) using the 3DS0 mode, in which the two Bearer channels (B1 and B2) and a signaling channel (D) are crossconnected as three DS0 data channels.

For ISDN BRI service using GR-303, see *Provision ISDN BRI 4:1 TDM Service to Subscribers* on page 10-25.

Provisioning TR-08 Service with DCS

- Provisioning Conventional TR-08 Voice Services ... 9-4
- Provisioning Enhanced Voice and Data Services ... 9-5
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Any Access Navigator can provide basic support for existing TR-08 channel banks configured as Shelf B, C, or D channel units. The Access Navigator can groom and fill DS1s, but will not perform call concentration, signaling translation, or Shelf A data link management.

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Provisioning Conventional TR-08 Voice Services

The Access Navigator's Digital Crossconnect Switch (DCS) functions can provide basic support for existing TR-08 channel banks configured as Shelf B, C, or D channel units (see Figure 9-2). The Access Navigator/DCS can groom and fill DS1s with TR-08 voice channels, but will not perform call concentration, signaling translation, or Shelf A data link management. (For provisioning the Access Bank® I/TR-08, see *Provisioning TR-08 Service with GR-303 Translation* on page 10-5.)

Any number of TR-08 Shelf B, C, and D channel units can connect to the Access Navigator/DCS "drop" DS1s using D4 or ESF framing.

NOTE: ESF is not standard for TR-08. This option has been added to allow remote management of the Access Bank® II. See *Provision Remote Access Bank II* on page 11-1.

A TR-08/SLC-96 compatible switch connects to the Access Navigator "groom" DS1s using D4 framing (equivalent to SLC-96 SF framing). By crossconnecting the voice channels at the DS0 level, the Access Navigator is able to groom and fill the DS1s going to the TR-08 switch for most efficient use of DS1 resources.

DCS also works with drop DS1s carrying both voice and data channels. For example, an Access Bank II with Special POTS cards provides TR-08 voice channels as well as high-speed data over the same DS1. The Access Navigator can easily cross-connect the data channels to other groom DS1s providing access to Internet and other data services.

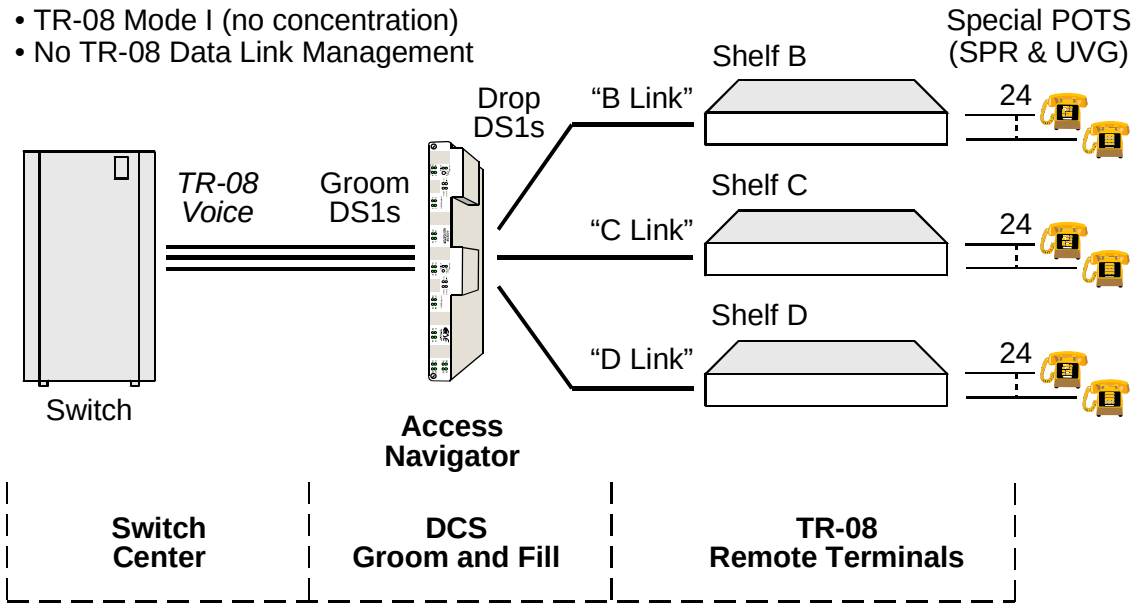

Figure 9-2 Provisioning Voice Services for TR-08 Shelves B, C, and D

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Provisioning Enhanced Voice and Data Services

DCS also works with drop DS1s carrying both voice and data channels. For example, an Access Bank® II with Special POTS (SPOTS) cards provides TR-08 voice channels as well as high-speed data over the same DS1. The Access Navigator can easily crossconnect the data channels to groom DS1s providing access to Internet and other data services.

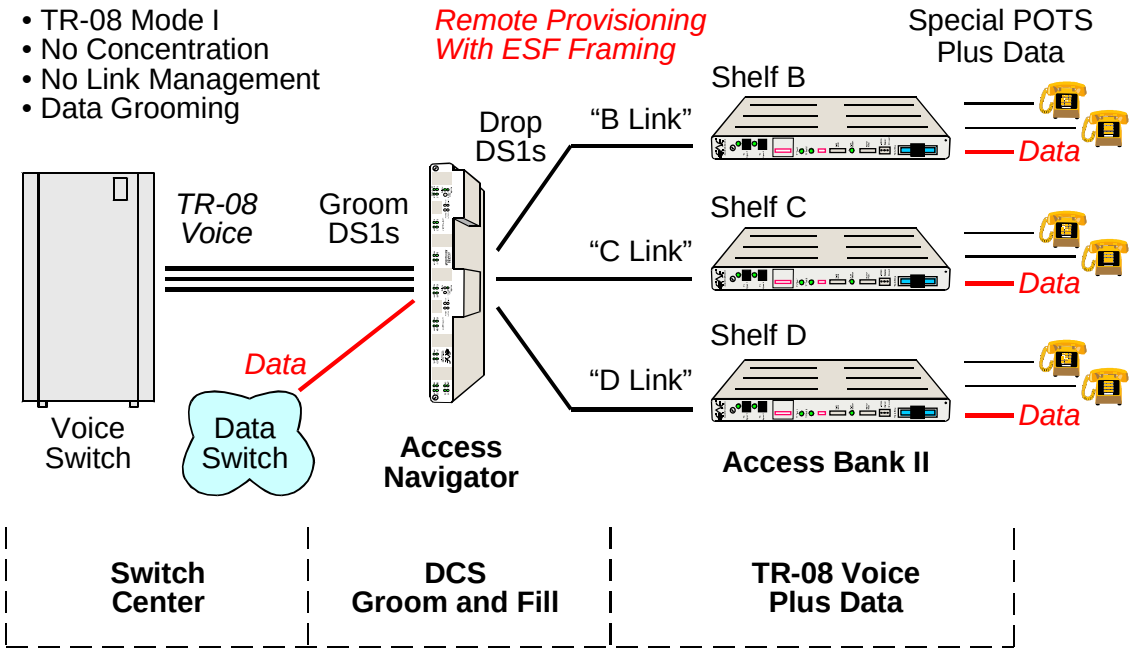

Figure 9-3 Access Bank II TR-08 Provides Enhanced Voice and Data Services

Special TR-08 Settings

DCS provisioning for TR-08 Shelf B, C, D support requires the following settings for the DS1 drop and groom lines. (For other DCS settings, see *Provisioning TR-08 Service with DCS* on page 9-3.)

CLI Commands	TR-08 Item Descriptions
set ds1 <*n*> **framing d4** **set ds1** <*n*> **framing esf**	DS1 drop to TR-08 channel bank DS1 drop to remote Access Bank II
set ds1 <*n*> **framing d4**	DS1 groom to TR-08 switch
set ds0 <*n:ch*> **type voice** **set ds0** <*n:ch*> **type data**	DS0 type for TR-08 voice channels DS0 type for enhanced data services

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DCS Provisioning Quick Guide

CLI Commands	Descriptions
status equipment	Verify equipment configuration.
show ds1 <*n*|**all**> **status ds1** <*n*> **status ds0** <*n:ch*>	Verify service status.
set ds1 <*n*> **down** **set ds0** <*n:ch*> **down** **set ds0** <*n:ch*> **type** <**voice**|**data**>	Set unused circuits out of service (down). If the DS1 is not terminated, set the DS0 type of all channels to data. If the DS1 is terminated, set the DS0 type of any unused channels to match the DS0 type (voice or data) configured on the device at the other end of the DS1.
set clock1 <**bits**|**ds1** *n*|**internal**>	Primary system clock source.
set clock2 <**bits**|**ds1** *n*|**internal**>	Secondary system clock source.
set ds1 <*n*> **type** <**groom**|**drop**>	DS1 type.
set ds1 <*n*> **framing** <**d4**|**esf**>	DS1 framing.
set ds1 <*n*> **linecode** <**ami**|**b8zs**>	DS1 line code.
set ds1 <*n*> **id** <*"id"*>	DS1 identifier.
set ds1 <*n*> **clock** <**normal**|**loop**>	DS1 clock source.
set ds1 <*n*> **lbo** <*setting*>	DS1 line buildout.
set ds1 <*n*> **loopdetect** <**on**|**off**>	Usually off for drop DS1s.
show connect <*n*>	Verify DS0 crossconnections.
disconnect <*n:ch*>	Remove old DS0 connections.
set ds0 <*n:ch*> **type** <**voice**|**data**>	DS0 type (use data type for ISDN PRI passthrough).
set ds0 <*n:ch*> **signal** <**ls**|**gs**|**em**>	DS0 signaling (voice type only).
connect <*n:ch*> <*n:ch*>	Add DS0 crossconnections.
set ds0 <*n:ch*> **up**	Set DS0s in service.
set ds1 <*n*> **up**	Set DS1s in service.

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Obtain Provisioning Information

1. Obtain office records for installation site.
2. Obtain circuit orders for DCS service turn up.

Verify System Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

1. Start management session (see *Start Management Session* on page 7-1).
2. Show system equipment configuration with the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version and options.

```
Equipment        Status             Version
---------        ------             -------
Controller A     Active             01.70
Controller B     Standby            01.70
DS1 Card 1       Installed           1
DS1 Card 2       Installed           1
DS1 Card 3       Installed           1
DS1 Card 4       Installed           1
DS1 Card 5       Installed           1
DS1 Card 6       Installed           1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```


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Verify Service Status

1. Verify number of DS1 circuits installed by comparing equipment status with office records. If there is a discrepancy, follow standard practices to resolve problem.
2. Show current DS1 service status with the following command:

   `show ds1 all`

   A message similar to the following will appear, showing the link up/down service status of all DS1s in the Access Navigator, as well as certain other parameters of common interest in provisioning and trouble-shooting.

Circuit ID	Link	Type	Line Code	Framing	Term ID	FDL	Remote Device Mgmt
CA DS1# 01	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 02	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 03	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 04	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 05	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 06	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 07	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 08	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 09	UP	DROP	B8ZS	ESF		None	CA FDL
CA DS1# 10	UP	DROP	B8ZS	ESF		None	CA IP
CA DS1# 11	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 12	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 13	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 14	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 15	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 16	UP	DROP	AMI	D4		None	None
CA DS1# 17	UP	DROP	AMI	D4		None	None
CA DS1# 18	UP	DROP	B8ZS	SLC96		None	SLC96
CA DS1# 19	UP	DROP	B8ZS	SLC96		None	None
CA DS1# 20	UP	DROP	B8ZS	ESF		T1403	None
CA DS1# 21	UP	GROOM	B8ZS	ESF		None	None
CA DS1# 22	UP	GROOM	B8ZS	ESF		None	None
CA DS1# 23	UP	GROOM	B8ZS	ESF		None	None
CA DS1# 24	UP	GROOM	B8ZS	ESF		None	None
CA DS1# 25	DOWN	SWITCH	B8ZS	ESF	1	None	None
CA DS1# 26	DOWN	SWITCH	B8ZS	ESF	3	None	None
CA DS1# 27	DOWN	SWITCH	B8ZS	ESF	4	None	None
CA DS1# 28	DOWN	SWITCH	B8ZS	ESF	5	None	None
CA DS1# 29	DOWN	SWITCH	B8ZS	ESF	2	None	None
CA DS1# 30	DOWN	SWITCH	B8ZS	ESF	6	None	None
CA DS1# 31	DOWN	SWITCH	B8ZS	ESF	7	None	None
CA DS1# 32	UP	GROOM	B8ZS	ESF		None	None

NOTE: In the above message, the DS1 type may be drop, groom, or switch. The "switch" type will appear only in Access Navigator versions with the GR-303 Option. The line termination identifier (TermID) is used only for communicating over the EOC and TMC with the GR-303 switch.

3. Verify number of DS1s already in service (link is up) by comparing DS1 link status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing as `ds1 <n>` require the operator to enter a DS1 number or range of numbers. For example, DS1 #6 is entered as `ds1 6`. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing `ds1 1-8`.

4. Show current DS1 status with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status ds1` <*n*>

   Example: status ds1 1-32

   This command will produce a message listing the status of the specified DS1 or range of DS1s. For example, the messages for DS1 #1 and #29 might look similar to the following. Note that the message for DS1 #1 shows the DS1 is in service, while the message for DS1 #29 indicates there is no Quad Framer circuit card installed.

```
Status for DS1 1:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  In Service
    FDL type:               None

Status for DS1 29:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  Card Not Installed
    FDL Type:               None
```

5. Verify status of DS1 lines to be turned up by comparing DS1 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

NOTE: Commands containing `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

6. Display current DS0 status with the following command, where <*n:ch*> is the DS0 or range of DS0s in the DS1 to be turned up:

   `status ds0` <*n:ch*>

   Example: status ds0 1:1-4

   The status command will display the status for each DS0 specified. For example, the message for DS1 #1, DS0 channels 1 to 4, and DS1 #32, DS0 channels 1 to 4, would look similar to the following:

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```
Interface              Status
---------              ------
DS1 1 Channel 1        In Service
DS1 1 Channel 2        In Service
DS1 1 Channel 3        In Service
DS1 1 Channel 4        Out of Service

DS1 32 Channel 1       Card Not Installed
DS1 32 Channel 2       Card Not Installed
DS1 32 Channel 3       Card Not Installed
DS1 32 Channel 4       Card Not Installed
```

7. Verify status of DS0 circuits on DS1 lines to be turned up by comparing DS0 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

Set Unused Circuits Out of Service

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch.
Set unused DS1s out of service (down).
Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to data.

Set unused circuits out of service with the following commands.

set ds1 <*n*> **down**
set ds0 <*n:ch*> **type** <**voice**|**data**>

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Set System Clock Source

NOTE: If Access Navigator provides GR-303 call support, the primary and secondary clock sources are usually set to "switch" DS1s in the GR-303 interface group.

1. Show current clock settings with the following command:

   `show clock`

   This command will produce a message similar to the following:

   Primary Master Transmit Clock Source: DS1 1
   Secondary Master Transmit Clock Source: DS1 25

2. If clock settings are correct, skip remaining steps.

3. If primary clock setting is incorrect, set clock1 source with the following command:

   `set clock1` *<setting>*

   Example: set clock1 bits

   There are three different settings, which are defined as follows:

Setting	Definition
bits	Select external or BITS source on Timing In connector
ds1 <n>	Select clock recovered from DS1 number n
internal	Select internal oscillator

4. If secondary clock setting is incorrect, set clock2 source with the following command:

   `set clock2` *<setting>*

   Example: set clock2 ds1 5

   Choose setting from list in previous step.

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Provision "Groom" DS1 Circuits to Network

1. Show groom DS1 settings with the following command:

   show ds1 <*n*>

   Example: show ds1 10

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 10 might look similar to the following:

```
Settings for DS1 10:
  Circuit ID:            CA DS1# 10
  Up/Down:               DOWN
  Framing:               ESF
  Line Coding:           B8ZS
  Type:                  DROP
  Clock Source:          NORMAL
  Line Build Out:        DSX-1 EQUALIZATION FOR 0-133 ft.
  Loop Code Detection:   OFF
  Loop Back:             OFF
  Line Termination ID:   0 (for switch DS1s only)
  FDL Type:              CAC
  Send Code:             None
  Performance Thresholds:      15 min.    1 hour     1 day
                              --------   -------    ------
  unavailable seconds:              0         0         0
  severely errored seconds:         0         0         0
  errored seconds:                  0         0         0
  sev. errored frame seconds:       0         0         0
  degraded minutes:                 0         0         0
  linecode violations:              0         0         0
```

NOTE: In the above message loop back test function is turned off and the send code set to none during normal service. Line Termination IDs are used only for GR-303 switch DS1s.

2. If groom DS1 settings are correct, skip remaining steps.

3. Set DS1 type to "groom" with the following command:

   set ds1 <*n*> **type groom**

   Example: set ds1 10 type groom

4. Set groom DS1 frame type to D4 or ESF with the following command:

   set ds1 <*n*> **framing** <*d4|esf*>

   Example: set ds1 10 framing esf

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5. Set groom DS1 line code to AMI or B8ZS with the following command:

   set ds1 <*n*> **linecode** <*ami|b8zs*>

   Example: set ds1 10 linecode b8zs

6. Set groom DS1 circuit ID with the following command:

   set ds1 <*n*> **id** <*"id"*>

   Example: set ds1 10 id "Acme Corp DS1#5"

   The ID may contain up to 20 characters and must be enclosed in quote marks.

NOTE: DS1 clock must be set to "normal" for normal operation.

7. Set groom DS1 clock source to normal or loop with the following command:

   set ds1 <*n*> **clock** <*normal|loop*>

   Example: set ds1 10 clock normal

8. Set groom DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation with the following command:

   set ds1 <*n*> **lbo** <*setting*>

   Example: set ds1 10 lbo 3

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

9. Set groom DS1 loop request code detection to on or off with the following command:

   set ds1 <*n*> loopdetect <*on|off*>

   Example: set ds1 10 loopdetect on

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Test Groom DS1 Circuits

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

Follow standard practices to test groom DS1 circuits.

Provision "Drop" DS1 Circuits to Subscribers

1. Show drop DS1 settings with the following command:

   `show ds1` *<n>*

   Example: show ds1 20

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 20 might look similar to the following:

```
Settings for DS1 10:
  Circuit ID:            CA DS1# 20
  Up/Down:               DOWN
  Framing:               ESF
  Line Coding:           B8ZS
  Type:                  DROP
  Clock Source:          NORMAL
  Line Build Out:        DSX-1 EQUALIZATION FOR 0-133 ft.
  Loop Code Detection:   OFF
  Loop Back:             OFF
  Line Termination ID:   0 (for switch DS1s only)
  FDL Type:              CAC
  Send Code:             None
  Performance Thresholds:      15 min.    1 hour     1 day
                              --------   -------    ------
  unavailable seconds:              0         0         0
  severely errored seconds:         0         0         0
  errored seconds:                  0         0         0
  sev. errored frame seconds:       0         0         0
  degraded minutes:                 0         0         0
  linecode violations:              0         0         0
```

NOTE: In the above message loop back test function is turned off and the send code set to none during normal service. Line Termination IDs are used only for GR-303 switch DS1s.

2. If drop DS1 settings are correct, skip remaining steps.

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3. Set DS1 type to "drop" with the following command:

   `set ds1 <n> type drop`

   Example: set ds1 20 type drop

4. Set drop DS1 frame type to D4 or ESF with the following command:

   `set ds1 <n> framing <d4|esf>`

   Example: set ds1 20 framing esf

5. Set drop DS1 line code to AMI or B8ZS with the following command:

   `set ds1 <n> linecode <ami|b8zs>`

   Example: set ds1 20 linecode b8zs

6. Set drop DS1 circuit ID with the following command:

   `set ds1 <n> id <"id">`

   Example: set ds1 20 id "Acme Corp DS1#20"

   The ID may contain up to 30 characters and must be enclosed in quote marks.

7. Set drop DS1 clock source to normal or loop with the following command:

   `set ds1 <n> clock <normal|loop>`

   Example: set ds1 20 clock normal

8. Set drop DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation with the following command:

   `set ds1 <n> lbo <setting>`

   Example: set ds1 20 lbo 8

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop request code detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests.

9. Set drop DS1 loop request code detection to on or off with the following command:

   `set ds1 <n> loopdetect <on|off>`

   Example: set ds1 20 loopdetect on

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Provision and Connect ISDN PRI Channels

Full and fractional ISDN PRI passthrough service is provisioned and connected in the same way as other DS0 data channels (described on the following pages). For each ISDN PRI channel to be provisioned, the operator must create crossconnections for the desired number of bearer channels (B1 up to B23) and the signaling channel (D). All PRI channels must be set to the DS0 Type Data.

Provision and Connect ISDN BRI 3DS0 Channels

ISDN BRI service using 3DS0 transport mode is provisioned and connected in the same way as other DS0 data channels (described on the following pages), except that each ISDN BRI requires three DS0s. For each ISDN BRI to be provisioned, the operator must create crossconnections for the two bearer channels (B1 and B2) and the signaling channel (D). All BRI channels must be set to the DS0 Type Data.

To provision ISDN BRI 4:1 TDM transport mode using GR-303, see *Provision ISDN BRI 4:1 TDM Service to Subscribers* on page 10-25.

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Provision and Connect DS0s

1. Show current DS0 crossconnections with the following command:

   `show connect` *<n>*

   Example: show connect 10

   The **`show connect`** command displays DS0 crossconnections on a DS1. For example, the message for DS1 number 25, DS0 channels 1 to 4 would look similar to the following:

```
Connections for DS1 #10 (CA DS1# 10):

From  To    Type  Interface [--> Port]
----  ----- ----- --------------------
10:01 ..... GR303
10:02 ..... GR303
10:03 ..... GR303
10:04 ..... GR303
10:05 ..... GR303
10:06 ..... GR303
10:07 ..... GR303
10:08 ..... GR303
10:09 25:17 GR303
10:10 ..... GR303
10:11 ..... GR303
10:12 ..... GR303
10:13 .....
10:14 .....
10:15 .....
10:16 .....
10:17 09:12 DATA  AcmeInternet --> V.35
10:18 09:13 DATA  AcmeInternet --> V.35
10:19 09:14 DATA  AcmeInternet --> V.35
10:20 09:15 DATA  AcmeInternet --> V.35
10:21 09:16 DATA  AcmeInternet --> V.35
10:22 09:17 DATA  AcmeInternet --> V.35
10:23 09:18 DATA  AcmeInternet --> V.35
10:24 09:19 DATA  AcmeInternet --> V.35
```

2. If DS0 crossconnections are correct, skip remaining steps.

NOTE: To change existing DS0 connections or DS0 Type, you must first disconnect them before making new connections.

3. Disconnect existing DS0s with the following command:

   `disconnect` *<n:ch>*

   Example: disconnect 10:1-24

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NOTE: DS0 voice channels use robbed-bit signaling, while DS0 data are clear channels (no signaling). ISDN PRI DS0 passthrough channels and ISDN BRI 3DS0 channels must be set to DS0 Type Data.

4. Set DS0 type to voice or data with the following command:

   `set ds0` *<n:ch>* **`type`** *<voice|data>*

   Example: set ds0 10:1-18 type voice

   Example: set ds0 10:19-24 type data

5. Set DS0 signaling (voice only) to Loop Start (ls), Ground Start (gs), or E&M (em) signaling with the following command:

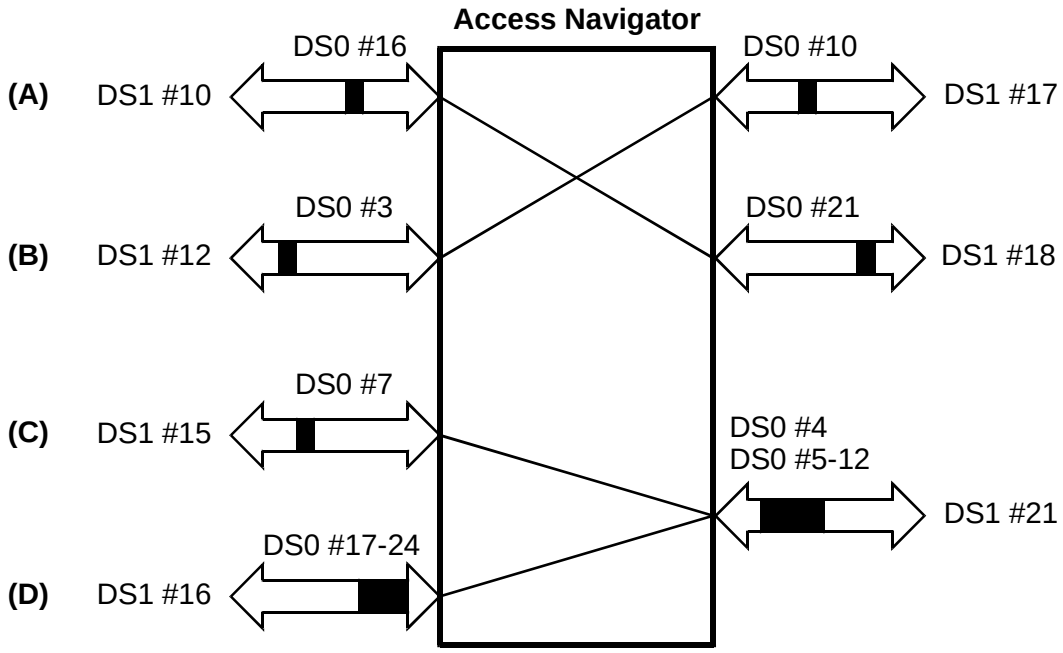
   `set ds0` *<n:ch>* **`signal`** *<ls|gs|em>*

   Example: set ds0 10:1-18 signal gs

6. Connect DS0s (see crossconnect examples in Figure 9-4) to make 2-way connections between DS0s, or fractional groups of DS0s, with the following command:

   `connect` *<n:ch>* *<n:ch>*

   Example: connect 10:19-24 5:1-6



Command Examples: (A) connect ds0 10:16 18:21
(B) connect ds0 12:3 17:10
(C) connect ds0 15:7 21:4
(D) connect ds0 16:17-24 21:5-12

Figure 9-4 Crossconnect Examples

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Turn Up Service

1. Show current DS1 status with the following command:

   `status ds1` *<n>*

   Example: status ds1 1-32

2. Show current DS0 status with the following command:

   `status ds0` *<n:ch>*

   Example: status ds0 1:1-24

   Example: status ds0 8:1-24

3. If drop DS1 and DS0 settings are correct, skip remaining steps.

4. Set DS1s and DS0s to in-service (up) status with the following commands:

   `set ds1` *<n>* **`up`**
   `set ds0` *<n:ch>* **`up`**

   Example: set ds1 5 up

   Example: set ds0 5:1-6

Test DS1 and DS0 Circuits

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

1. Follow standard practices to test subscriber drop DS1 circuits.
2. Follow standard practices to test DS0 connections.

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CHAPTER 10

Provision GR-303 Service

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GR-303 Provisioning Overview

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- Provisioning P-Phone Service ... 10-4
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This procedure covers provisioning of GR-303 voice, P-Phone, and ISDN BRI services. The Access Navigator provides GR-303 call support by setting up crossconnects only when needed. This enables efficient switch usage by allowing the Access Navigator to provide call concentration, in which many subscriber "drop" DS0s can be connected as needed to a smaller number of GR-303 "switch" DS0s.

In a GR-303 system the Central Office switch is the Integrated Digital Terminal (IDT) and the Access Navigator and Access Banks function as the Remote Digital Terminal (RDT). The switch communicates with the Access Navigator using an Embedded Operations Channel (EOC) and Timeslot Management Channel (TMC) in the GR-303 Interface Group. The switch sets up crossconnects in the Access Navigator between switch DS0s drop DS0s. (The Access Navigator will provide a busy tone for blocked calls.) Each drop DS0 is identified by a unique Call Reference Value (CRV).

NOTE: To avoid communications problems, the switch DS1s and drop CRVs must be provisioned identically in the Access Navigator and the GR-303 switch. For example, if the Access Navigator uses five switch DS1s, the switch must also use five DS1s. If the Access Navigator uses CRVs 20 to 72, the switch must also use CRVs 20 to 72.

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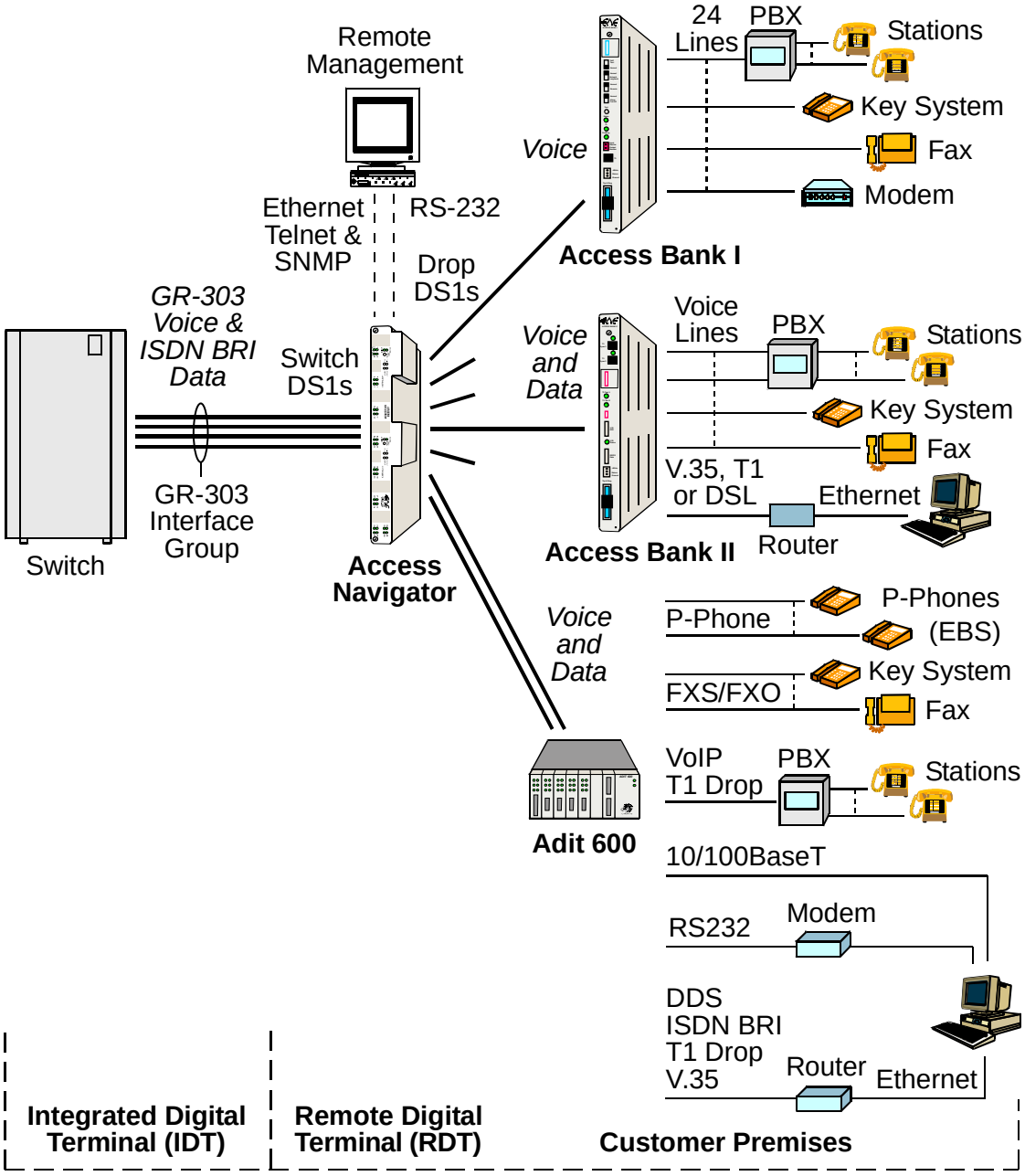

Figure 10-1 Access Navigator GR-303 Services

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Provisioning ISDN BRI Service

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) operates at 144,000 bits per second and is designed for desktop service. ISDN BRI is also referred to as 2B+D because it provides two Bearer channels (B1 and B2) at 64 kilobits per second, plus one D channel for signaling at 16 kilobits per second.

ISDN BRI settings and status depend on the mode.

- 3DS0 Mode transports each ISDN BRI as three DS0s, one each for the B1, B2, and D channels. These DS0s are provisioned as digital crossconnects between groom and drop DS0s. The DS0 Type must be set to Data. No special ISDN commands are used.
- 4:1 TDM Mode transports each ISDN BRI as 2.25 DS0s, one for each B channel and 0.25 for the D channel by multiplexing four D channels onto one DS0. This mode can efficiently carry 4 BRIs using only 9 DS0s. This mode works with GR-303 switch interfaces, using a fixed connection for the D channel and dynamically connecting the two B channels when needed.

The Access Navigator provides GR-303 support for ISDN BRI service using the 4:1 TDM mode, which combines the D (signaling) channels of four BRI connections into one DS0 channel that is statically connected to the switch. In the 4:1 TDM mode, the switch uses Call Reference Values (CRVs) to set up ISDN BRI connections for the B1 and B2 (bearer) channels.

For 3DS0 transport mode using DCS, see *Provisioning ISDN BRI Service* on page 9-3.)

Provisioning P-Phone Service

The Nortel Proprietary Phone (P-Phone), also called an Electronic Business Set (EBS), is an analog Centrex service offered by Nortel and supported by Nortel DMS switches and P-Phone compatible telephone stations. The analog signal between the P-Phone and Central Office is a single-pair subscriber loop providing normal full-duplex analog voice and an 8-kHz half-duplex amplitude-shift-keyed signal that carries signaling information.

The Access Navigator and Adit 600 provide P-Phone support by converting the analog P-Phone signals to more efficient digital loop carriers. The Access Navigator can support up to 384 P-Phone channels. The Adit 600 is equipped with P-Phone service cards that connect to the customer's analog P-Phones. The P-Phone signaling information then travels over the GR-303 TMC channel between the Access Navigator and the Nortel DMS switch. The switch uses Call Reference Values (CRVs) to set up DS0 cross-connections in the Access Navigator to set up calls to the P-Phones. This approach also provides efficient GR-303 call concentration and reduces facility costs.

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Provisioning TR-08 Service with GR-303 Translation

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- Access Bank I/TR-08 Switch Settings ... 10-8
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The Access Navigator/GR-303 includes GR-303 to TR-08 translation to allow simple migration from older AT&T SLC-96® type digital loop carrier systems with TR-08 interfaces to newer systems with GR-303 interfaces (see Figure 10-2). In addition, the Access Navigator can perform GR-303 call concentration and DCS grooming for data services.

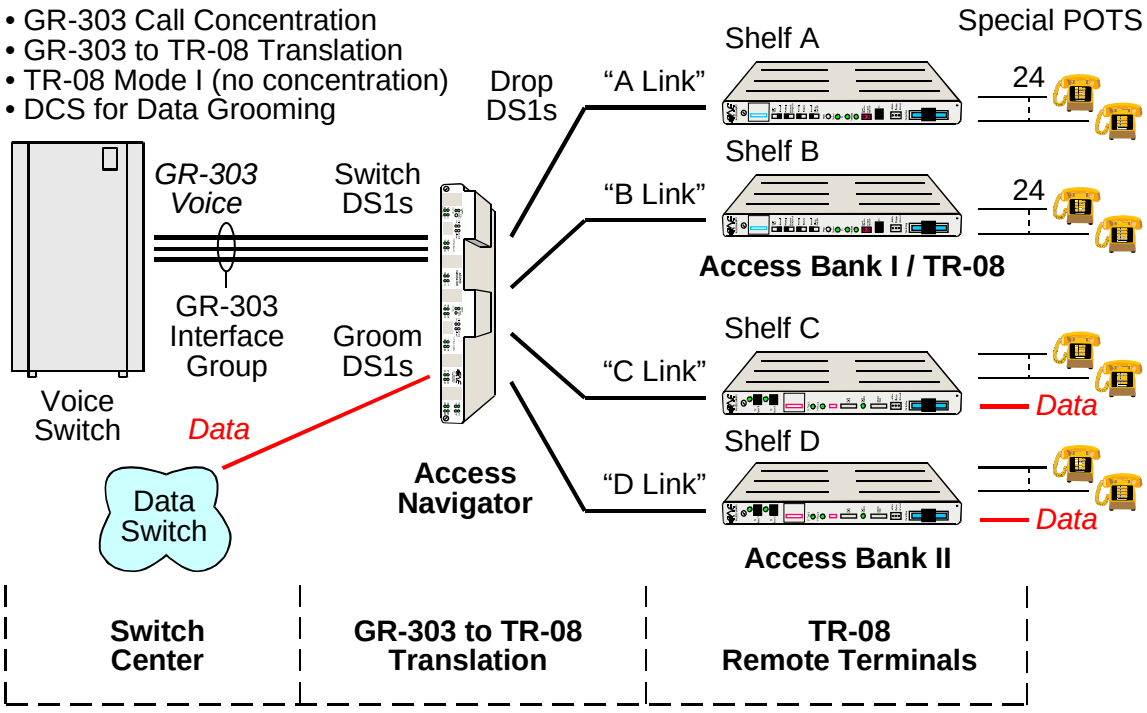

Figure 10-2. Provisioning TR-08 Service to Access Banks

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TR-08 Configuration

TR-08 terminals can have up to four shelves (A, B, C, D) with each shelf terminating up to 24 voice lines. Access Banks support TR-08 Mode I operation. This is a non-concentrating, non-blocking implementation where each telephone connection is physically tied to a specific DS0 channel. Mode I is ideal for distributed phone systems with Access Banks located on different floors or in different buildings. Access Banks are designed to function independently — there are no interconnection cables between shelves for management, alarms, or power distribution.

- The Access Bank I/TR-08 can be configured as either Shelf A (with alarms) or as Shelf B, C, or D (without alarms). When using GR-303 translation, all units can be configured as Shelf A to get AT&T 54016 performance report message alarms.
- An Access Bank II must be configured as Shelf B, C, or D, with the DS1 link framing set to D4. Access Navigator DS1 drop framing must be set to "slc96" to provide GR-303 to TR-08 translation.

NOTE: The Access Bank II must have Controller card software version 2.26 or higher to support TR-08. Remote provisioning is not possible with D4 framing, so Remote Monitor software version 2.04 or higher is needed to provision the Access Bank II.

Special POTS Cards

Access Banks can have one or two Special POTS (SPOTS) cards, each providing 12 analog voice channels with TR-08/SLC-96 compatible AB bit signaling. Carrier Access' SPOTS cards provide, on a per channel basis, either loopstart Single Party Ringing (SPR) or groundstart Universal Voice Grade (UVG) service with CLASS® features.

Signaling Translation

The Access Navigator automatically performs GR-303 to TR-08 translation of the AB signaling bits when the drop DS1s are set to "slc96" framing.

CRV Numbering

TR-08 systems use an odd-even numbering scheme (Figure 10-4) when assigning call reference values (CRVs) to subscriber DS0s. If desired, the Access Navigator can also assign CRVs in sequential order (Figure 10-3).

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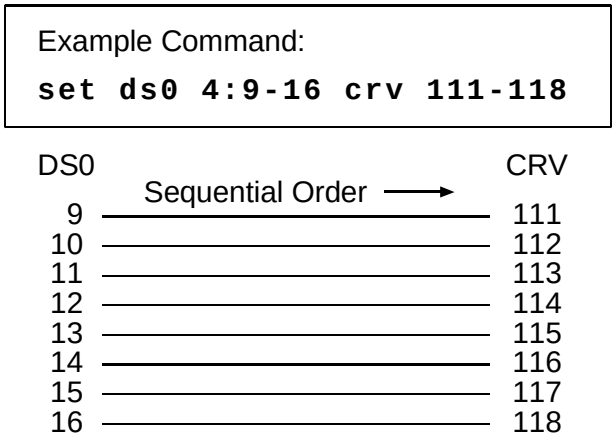

Figure 10-3. DS0s Assigned to CRVs in Sequential Order

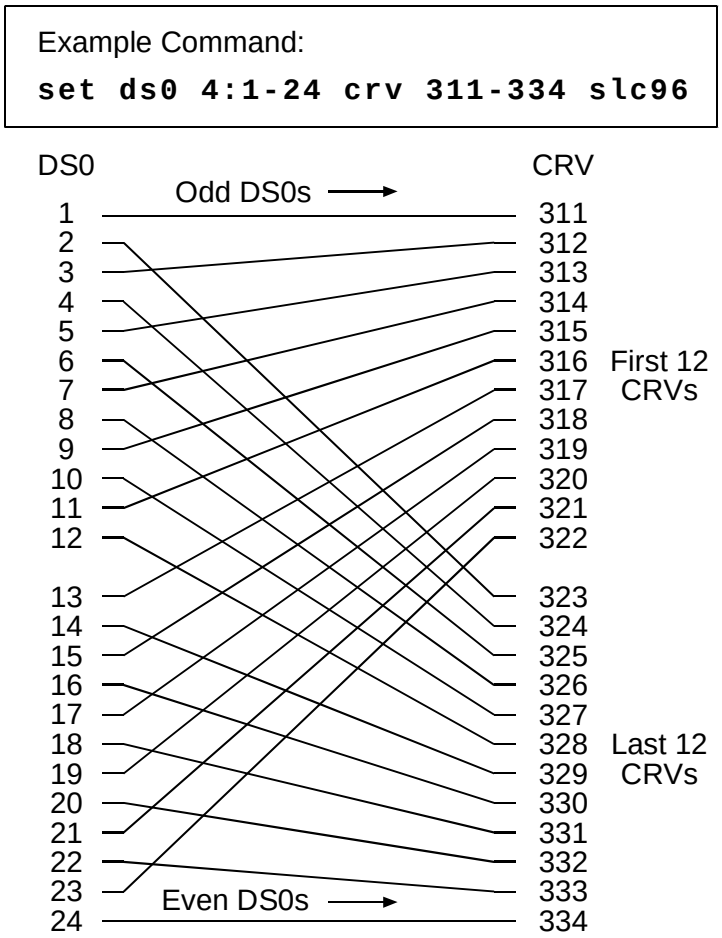

Figure 10-4. DS0s Assigned to CRVs in Odd-Even Order

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Framing and FDL Settings

SLC-96 uses two types of framing: SLC-96 DLL and SLC-96 S4. The combination of setting for the framing type and FDL protocol determine which framing type will be used for the drop DS1. For Shelf A, the DS1 FDL protocol is set to "slc96" to obtain SLC-96 DDL framing with its out-of-band data link management channel. For Shelf B, C, and D, the FDL is set to "none" to obtain standard SLC-96 S4 (or D4) framing.

Access Bank I/TR-08 Switch Settings

When installing the Access Bank I/TR-08, Switch 4 (framing) on its front panel is set OFF for Shelf A, or set ON for Shelf B, C, D. Response to loopback code patterns presented over the DS1 (T1) line also depends on the settings of Switch 4 and Switch 6. Because there are no interconnections between shelves, alarm monitoring is only available for Shelf A. If desired, all units can be configured as Shelf A when using GR-303 to TR-08 translation.

Switch 4	Switch 6	Shelf	Access Bank I/TR-08 Loopback Code Response
OFF	OFF or ON	A	Responds only to FDL (SLC-96 DDL) loopback codes
ON	OFF	B, C, D	Responds to CSU loopback codes
ON	ON	B, C, D	Does not respond to CSU loopback codes

Special TR-08 Settings

GR-303 provisioning for TR-08 Shelf B, C, D support requires the following settings for the DS1 drop lines. Other GR-303 settings remain the same. See *GR-303 Provisioning Quick Guide* on page 10-9.

CLI Commands	TR-08 Item Descriptions
set ds1 <*n*> **framing slc96** **set ds1** <*n*> **fdl slc96**	DS1 drop to TR-08 Shelf A
set ds1 <*n*> **framing slc96** **set ds1** <*n*> **fdl none**	DS1 drop to TR-08 Shelf B, C, and D
set ds0 <*n:ch*> **type voice** **set ds0** <*n:ch*> **type data**	DS0 type for TR-08 voice channels DS0 type for enhanced data services
set ds0 <*n:ch*> **crv** <*range*> **set ds0** <*n:ch*> **crv** <*range*> **slc96**	Assign CRVs in sequential order. Assign CRVs in odd-even (slc96) order. See Figure 10-3 and Figure 10-4.

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GR-303 Provisioning Quick Guide

CLI Commands	Descriptions
status equipment	Verify equipment configuration.
show ds1 <*n*|**all**> **status ds1** <*n*> **status ds0** <*n:ch*>	Verify service status.
set ds1 <*n*> **down** **set ds0** <*n:ch*> **down** **set ds0** <*n:ch*> **type** <**voice**|**data**>	Set unused circuits out of service (down). If the DS1 is not terminated, set the DS0 type of all channels to data. If the DS1 is terminated, set the DS0 type of any unused channels to match the DS0 type (voice or data) configured on the device at the other end of the DS1.
set clock1 <**bits**|**ds1** *n*|**internal**>	Primary system clock source.
set clock2 <**bits**|**ds1** *n*|**internal**>	Secondary system clock source.
set switch type <**5ess**|**dms**|**generic**>	Ensures switch compatibility.
set ds1 <*n*> **type** <**switch**|**groom**|**drop**>	DS1 type.
set ds1 <*n*> **framing** <**d4**|**esf**|**slc96**>	DS1 framing.
set ds1 <*n*> **linecode** <**ami**|**b8zs**>	DS1 line code.
set ds1 <*n*> **id** <*"id"*>	DS1 identifier.
set ds1 <*n*> **termid** <*id*>	Switch DS1 terminal identifier.
set ds1 <*n*> **clock** <**normal**|**loop**>	DS1 clock source.
set ds1 <*n*> **lbo** <*setting*>	DS1 line buildout.
set ds1 <*n*> **fdl** <**none**|**slc96**|**t1403**>	DS1 FDL type.
set ds1 <*n*> **remote device mgmt** **<none|cafdl|caip <***ipaddress***>|ds1** *n*>	Management link for remote Access Bank II and Adit 600.
set ds1 <*n*> **remote device mgmt** **caip <***ipaddress***> pphone**	Enables call communications channel for remote Adit 600 providing P-Phone service.
set eoc primary <*n:ch*|**none**> **set eoc secondary** <*n:ch*|**none**>	EOC channels.
set tmc primary <*n:ch*|**none**> **set tmc secondary** <*n:ch*|**none**>	TMC channels.
set ds1 <*n*> **loopdetect** <**on**|**off**>	Usually off for drop DS1s.
set ds0 <*n:ch*> **type** <**voice**|**data**|**gr303**>	DS0 type.
set ds0 <*n:ch*> **pphone**	P-Phone channels.

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CLI Commands	Descriptions
set ds0 <*n:ch*> **isdn** <**b1**|**b2**|**d**> **crv** <*range*>	ISDN BRI 4:1 TDM channels.
set ds0 <*n:ch*> **crv** <*range*> **set ds0** <*n:ch*> **crv** <*range*> **slc96**	Assign Drop DS0s to CRVs in sequential order or in odd-even (slc96) order.
connect <*n:ch*> <*n:ch*>	Connect ISDN D channel to Switch.
set ds0 <*n:ch*> **up**	Set DS0s in service.
set ds1 <*n*> **up**	Set DS1s in service.

Obtain Provisioning Information

1. Obtain office records for installation site.
2. Obtain circuit orders for GR-303 service turn up.

Verify System Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch. Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to data.

1. Start management session (see *Start Management Session* on page 7-1).
2. Show system equipment configuration with the following command:

   status equipment

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment       Status          Version
---------       ------          -------
Controller A    Active          01.70 GR-303 Option
Controller B    Standby         01.70 GR-303 Option
DS1 Card 1      Installed        1
DS1 Card 2      Installed        1
DS1 Card 3      Installed        1
DS1 Card 4      Installed        1
DS1 Card 5      Installed        1
```


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```
DS1 Card 6      Installed          1
DS1 Card 7      Card not installed
DS1 Card 8      Card not installed
```

Verify Service Status

1. Verify number of DS1 circuits installed by comparing equipment status with office records. If there is a discrepancy, follow standard practices to resolve problem.
2. Show current DS1 service status with the following command:

   `show ds1 all`

   A message similar to the following will appear, showing the link up/down service status of all DS1s in the Access Navigator, as well as certain other parameters of common interest in provisioning and trouble-shooting.

Circuit ID	Link	Type	Line Code	Framing	Term ID	FDL	Remote Device Mgmt
CA DS1# 01	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 02	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 03	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 04	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 05	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 06	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 07	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 08	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 09	UP	DROP	B8ZS	ESF		None	CA FDL
CA DS1# 10	UP	DROP	B8ZS	ESF		None	CA IP
CA DS1# 11	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 12	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 13	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 14	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 15	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 16	UP	DROP	AMI	D4		None	None
CA DS1# 17	UP	DROP	AMI	D4		None	None
CA DS1# 18	UP	DROP	B8ZS	SLC96		None	SLC96
CA DS1# 19	UP	DROP	B8ZS	SLC96		None	None
CA DS1# 20	UP	DROP	B8ZS	ESF		T1403	None
CA DS1# 21	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 22	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 23	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 24	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 25	DOWN	SWITCH	B8ZS	ESF	1	None	None
CA DS1# 26	DOWN	SWITCH	B8ZS	ESF	3	None	None
CA DS1# 27	DOWN	SWITCH	B8ZS	ESF	4	None	None
CA DS1# 28	DOWN	SWITCH	B8ZS	ESF	5	None	None
CA DS1# 29	DOWN	SWITCH	B8ZS	ESF	2	None	None
CA DS1# 30	DOWN	SWITCH	B8ZS	ESF	6	None	None
CA DS1# 31	DOWN	SWITCH	B8ZS	ESF	7	None	None
CA DS1# 32	UP	GROOM	B8ZS	ESF		None	None

3. Verify number of DS1s already in service (link is up) by comparing DS1 link status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing `ds1 <n>` require the operator to enter a DS1 number or range of numbers. For example, DS1 #6 is entered as `ds1 6`. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing `ds1 1-8`.

4. Show current DS1 status with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status ds1` <*n*>

   Example: status ds1 1

   This command will produce a message listing the status of the specified DS1 or range of DS1s. For example, the message for DS1 #1 and #29 might look similar to the following. Note that the message for DS1 #1 shows the DS1 is in service, while the message for DS1 #29 indicates there is no Quad Framer circuit card installed.

```
Status for DS1 1:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  In Service
    FDL Type:               None

Status for DS1 29:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  Card Not Installed
    FDL Type:               None
```

5. Verify status of DS1 lines to be turned up by comparing DS1 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

6. Display current DS0 status with the following command, where <*n:ch*> is the DS0 or range of DS0s in the DS1 to be turned up:

   `status ds0` <*n:ch*>

   Example: status ds0 1:1-4

   The status command will display the status for each DS0 specified. For example, the message for DS1 #1, DS0 channels 1 to 4, and DS1 #32, DS0 channels 1 to 4, would look similar to the following:

```
Interface              Status
---------              ------
DS1 1 Channel 1        In Service
DS1 1 Channel 2        In Service
DS1 1 Channel 3        In Service
DS1 1 Channel 4        Out of Service

DS1 32 Channel 1       Card Not Installed
DS1 32 Channel 2       Card Not Installed
DS1 32 Channel 3       Card Not Installed
DS1 32 Channel 4       Card Not Installed
```

7. Verify status of DS0 circuits on DS1 lines to be turned up by comparing DS0 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

Set Unused Circuits Out of Service

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch. Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to data.

Set unused circuits out of service with the following commands.

`set ds1` <*n*> **`down`**
`set ds0` <*n:ch*> **`down`**
`set ds0` <*n:ch*> **`type <voice|data>`**

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Set System Switch Type

NOTE: Access Navigator supports Lucent 5ESS, Nortel DMS, and generic Telcordia GR-303 switch types.

1. Show switch type with the following command:

   `show switch`
2. If switch type is correct, skip remaining steps.
3. Set switch type with the following command:

   `set switch type <5ess|dms|generic>`

   Example: set switch type 5ess

Set System Clock Source

NOTE: For GR-303 call support, the primary and secondary clock sources are usually set to two DS1s within the GR-303 Interface Group.

1. Show current clock settings with the following command:

   `show clock`

   This command will produce a message similar to the following:

   ```
   Primary Master Transmit Clock Source:     DS1 25
   Secondary Master Transmit Clock Source:   DS1 29
   ```

2. If clock settings are correct, skip remaining steps.

3. Set clock primary (clock1) source with the following command:

   `set clock1` *`<setting>`*

   Example: set clock1 bits

   There are three different settings, which are defined as follows:

Setting	Definition
bits	Select external or BITS source on Timing In connector
ds1 <n>	Select clock recovered from DS1 number n
internal	Select internal oscillator

4. Set clock secondary (clock2) source with one of the following commands:

   `set clock2` *`<setting>`*

   Example: set clock2 ds1 5

   Choose setting from list in previous step.

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Provision "Switch" DS1s to Interface Group

1. Show switch DS1 settings with the following command:

   show ds1 <*n*>

   Example: show ds1 25

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 25 might look similar to the following:

```
Settings for DS1 25:
  Circuit ID:             CA DS1# 25
  Up/Down:                DOWN
  Framing:                ESF
  Line Coding:            B8ZS
  Type:                   SWITCH
  Clock Source:           NORMAL
  Line Build Out:         DSX-1 EQUALIZATION FOR 0-133 ft.
  Loop Code Detection:    OFF
  Loop Back:              OFF
  Line Termination ID:    1(for switch DS1s only)
  FDL Type:               NONE
  Send Code:              NONE
  Performance Thresholds:      15 min.    1 hour     1 day
                              --------   -------    ------
  unavailable seconds:              0         0         0
  severely errored seconds:         0         0         0
  errored seconds:                  0         0         0
  sev. errored frame seconds:       0         0         0
  degraded minutes:                 0         0         0
  linecode violations:              0         0         0
```

NOTE: In the above message, loop back is a test function that is turned off during normal service. Line Termination IDs are used only by GR-303 switch DS1s.

2. If switch DS1 settings are correct, skip remaining steps.

3. Set DS1 type to "switch" with the following command:

   set ds1 <*n*> **type switch**

   Example: set ds1 25 type switch

4. Set switch DS1 frame type to ESF with the following command:

   set ds1 <*n*> **framing esf**

   Example: set ds1 25 framing esf

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5. Set switch DS1 line code to B8ZS with the following command:

   `set ds1` <*n*> **`linecode b8zs`**

   Example: set ds1 25 linecode b8zs

6. Set switch DS1 circuit ID with the following command:

   `set ds1` <*n*> **`id`** <*"id"*>

   Example: set ds1 25 id "CA DS1#5"

   The ID may contain up to 30 characters and must be enclosed in quote marks.

NOTE: GR-303 line termination IDs are used by the switch to set up calls through the Access Navigator via the EOC and TMC messages. Customers can change the termination IDs to match different installation configurations. The Access Navigator provides the following default termination IDs for DS1s 25 to 32, so that termination IDs 1 and 2 are on different Quad T1 Framer cards for added protection: DS1 25 termid = 1, DS1 26 termid = 3, DS1 27 termid = 4, DS1 28 termid = 5, DS1 29 termid = 2, DS1 30 termid = 6, DS1 31 termid = 7, DS1 32 termid = 8.

NOTE: To avoid duplication when setting line termination IDs, if another DS1 has the same termid number, it will be set to termid 0 (not assigned).

7. Set switch DS1 line termination ID with the following command:

   `set ds1` <*n*> **`termid`** <*id*>

   Example: set ds1 25 termid 2

NOTE: DS1 clock must be set to "normal" for normal operation.

8. Set switch DS1 clock source to normal or loop with the following command:

   `set ds1` <*n*> **`clock`** <*normal|loop*>

   Example: set ds1 25 clock normal

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9. Set switch DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation with the following command:

   `set ds1` *<n>* **`lbo`** *<setting>*

   Example: set ds1 25 lbo 3

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop request detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Detection is normally turned on for "switch" and "groom" DS1s and turned off for "drop" DS1s. This allows higher level equipment to test the Access Navigator, and allows the Access Navigator to test remote CSUs such as Access Banks.

10. Set switch DS1 loop code detection to on or off with the following command:

    `set ds1` *<n>* **`loopdetect`** *<on|off>*

    Example: set ds1 25 loopdetect on

NOTE: The Facility Data Link (FDL) channel is an 4 Kbps out-of-band communications link provided by the DS1 Extended Superframe (ESF) format. The default setting is "none". Switch DS1s do not use FDL, so the FDL protocol must be set to "none".

11. Set switch DS1 FDL protocol to "none" with the following command:

    `set ds1` *<n>* **`fdl none`**

    Example: set ds1 25 fdl none

    Example: set ds1 25-32 fdl none

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Assign Primary and Secondary EOC

1. Show current EOC settings with the following command:

   `show eoc`

   The show command will produce a message showing the embedded operation channel (EOC) settings similar to the following:

```
Settings for EOC:
     Primary EOC:        DS1 25, Channel 12
     Secondary EOC:      DS1 29, Channel 12
```

NOTE: For proper operation, the EOC must be on Channel 12 and the TMC on Channel 24 of the DS1. The first switch DS1 (TermID = 1) in the GR-303 interface group must contain the primary EOC and TMC. The second DS1 (TermID = 2) must contain the secondary EOC and TMC. By default, DS1 #25 is TermID 1 and DS1 #29 is TermID 2. The `show ds1 all` command lists the DS1 TermIDs.

2. If switch EOC settings are correct, skip remaining steps.

NOTE: It is recommended that primary and secondary EOC and TMC be assigned to different Quad T1 Framer (QF) cards for added protection. In the event one QF card fails, the GR-303 switch will then be able to continue service using the redundant EOC and TMC on a different QF card. QF card #1 contains DS1 #1 to #4 contains DS1 #5 to #8, etc. By default, the primary EOC and TMC are on DS1 #25 and the secondary EOC and TMC are on DS1 #29.

3. Set EOC primary location with the following command:

   `set eoc primary` *<n:ch|none>*

   Example: set eoc primary 25:12

   Example: set eoc primary none

4. Set EOC secondary location with the following command:

   `set eoc secondary` *<n:ch|none>*

   Example: set eoc secondary 29:12

   Example: set eoc secondary none

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Assign Primary and Secondary TMC

1. Show current TMC settings with the following command:

   `show tmc`

   The show command will produce a message showing the time-slot management channel (TMC) settings similar to the following:

```
Settings for TMC:
     Primary TMC:        DS1 25, Channel 24
     Secondary TMC:      DS1 29, Channel 24
```

NOTE: For proper operation, the EOC must be on Channel 12 and the TMC on Channel 24 of the DS1. The first switch DS1 (TermID = 1) in the GR-303 interface group must contain the primary EOC and TMC. The second DS1 (TermID = 2) must contain the secondary EOC and TMC. By default, DS1 #25 is TermID 1 and DS1 #29 is TermID 2. The `show ds1 all` command lists the DS1 TermIDs.

2. If switch TMC settings are correct, skip remaining steps.

NOTE: It is recommended that primary and secondary EOC and TMC be assigned to different Quad T1 Framer (QF) cards for added protection. In the event one QF card fails, the GR-303 switch will then be able to continue service using the redundant EOC and TMC on a different QF card. QF card #1 contains DS1 #1 to #4, QF card #2 contains DS1 #5 to #8, etc. By default, the primary EOC and TMC are on DS1 #25 and the secondary EOC and TMC are on DS1 #29.

3. Set TMC primary location with the following command:

   `set tmc primary` *<n:ch|none>*

   Example: set tmc primary 25:24

   Example: set tmc primary none

4. Set TMC secondary channel location with the following command:

   `set tmc secondary` *<n:ch|none|none>*

   Example: set tmc secondary 29:24

   Example: set tmc secondary none

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Test DS1 Circuits

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

NOTE: If the Access Navigator is connected to the local digital switch, you can use the `status eoc` and `status tmc` commands to determine the link status. "Up" status indicates the LAPD communications link with the switch is established and healthy.

Follow standard practices to test groom DS1 circuits.

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Provision "Drop" DS1 Circuits to Subscriber

1. Show drop DS1 settings with the following command:

   `show ds1` <*n*>

   Example: show ds1 9

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 1 might look similar to the following:

```
Settings for DS1 9:
  Circuit ID:              CA DS1# 9
  Up/Down:                 DOWN
  Framing:                 ESF
  Line Coding:             B8ZS
  Type:                    DROP
  Clock Source:            NORMAL
  Line Build Out:          CSU ATTEN FOR -15dB
  Loop Code Detection:     ON
  Loop Back:               OFF
  Line Termination ID:     0 (for switch DS1s only)
  Remote Device MGMT:      CA IP 192.168.201.1
  PPHONE Call Connection:  Enabled
  FDL Type:                None
  P-Phone:                 In Service
  Send Code:               NONE
  Performance Thresholds:      15 min.    1 hour     1 day
                              --------   -------    ------
  unavailable seconds:              0         0         0
  severely errored seconds:         0         0         0
  errored seconds:                  0         0         0
  sev. errored frame seconds:       0         0         0
  degraded minutes:                 0         0         0
  linecode violations:              0         0         0
```

NOTE: In the above message, loop back is a test function that is turned off during normal service. Line Termination IDs are used only for GR-303 switch DS1s.
FDL Status does not appear if FDL Type is none.
P-Phone settings only appear in the Access Navigator / GR-303 Host with P-Phone option, when the Remote Management type is CA IP with P-Phone enabled and the remote device is an Adit 600. (If P-Phone isn't enabled, the setting will list it as disabled.) (See *Provision Remote Adit 600 via IP DS0* on page 13-1.)

2. If drop DS1 settings are correct, skip remaining steps.

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3. Set DS1 type to "drop" with the following command:

   `set ds1 <n> type drop`

   Example: set ds1 9 type drop

NOTE: The Access Navigator provides GR-303 to SLC-96/TR-08 translation for Shelf A, B, C, or D when the drop DS1 framing is set to "slc96".

A drop DS1 providing GR-303 to TR-08 translation must use "slc96" FDL protocol for Shelf A and "none" for Shelf B, C, and D. A remote Access Bank I/TR-08 can operate as Shelf A, B, C, or D. An Access Bank II requiring TR-08 translation must operate as Shelf B, C, or D.

Remote provisioning of an Access Bank II requires "esf" framing and "cafdl" protocol.

4. Set drop DS1 frame type to D4, ESF, or SLC-96 with the following command:

   `set ds1 <n> framing <d4|esf|slc96>`

   Example: set ds1 9 framing esf

5. Set drop DS1 line code to AMI or B8ZS with the following command:

   `set ds1 <n> linecode <ami|b8zs>`

   Example: set ds1 9 linecode b8zs

6. Set drop DS1 circuit ID with the following command:

   `set ds1 <n> id <"id">`

   Example: set ds1 9 id "CA ds1 #9"

   The ID may contain up to 30 characters and must be enclosed in quote marks.

NOTE: DS1 clock must be set to "normal" for normal operation.

7. Set drop DS1 clock source to normal or loop with the following command:

   `set ds1 <n> clock <normal|loop>`

   Example: set ds1 9 clock normal

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8. Set drop DS1 line buildout (lbo) to required CSU attenuation with the following command:

   set ds1 <*n*> **lbo** <*setting*>

   Example: set ds1 9 lbo 8

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop request detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Detection is normally turned on for "switch" and "groom" DS1s and turned off for "drop" DS1s. This allows higher level equipment to test the Access Navigator, and allows the Access Navigator to test remote CSUs such as Access Banks.

9. Set drop DS1 loop code detection to on or off with the following command:

   set ds1 <*n*> **loopdetect** <*on|off*>

   Example: set ds1 9 loopdetect off

NOTE: The Facility Data Link (FDL) channel is a 4 Kbps out-of-band communications link provided by the DS1 Extended Superframe (ESF) format. The factory default setting is "none". This turns off loopback code detection and transmission over the FDL channel. The "t1403" setting enables detection and response to ANSI T1.403 bit-patterned codes. A switch DS1 used for GR-303 voice traffic does not use FDL, so the FDL protocol must be set to "none".

- GR-303 to TR-08 Translation for a drop DS1 must use "slc96" FDL protocol for Shelf A and "none" for Shelf B, C, and D. A remote Access Bank I/TR-08 can operate as Shelf A, B, C, or D. An Access Bank II requiring TR-08 translation must operate as Shelf B, C, or D.

10. Set drop DS1 FDL protocol to none, SLC-96, or T1.403 with the following command:

    set ds1 <*n*> **fdl** <*none|slc96|t1403*>

    Example: set ds1 9 fdl none

    Example: set ds1 12 fdl t1403

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NOTE: Remote Access Bank II provisioning requires "esf" framing and remote device management for "cafdl" protocol. See *Provision Remote Access Bank II* on page 11-1.

Remote Adit 600 provisioning requires remote device management protocol for "cafdl" or "caip" depending on management configuration. P-Phone service is enabled by "caip" with the "pphone" option. There can be only one management DS1 to a remote Adit 600, so all other DS1s to that Adit 600 must be set to point to the management DS1. See *Provision Remote Adit 600 via FDL* on page 12-1 and *Provision Remote Adit 600 via IP DS0* on page 13-1.

11. Set drop DS1 remote device management protocol to none, Carrier Access FDL, Carrier Access IP, or a DS1 with the following command:

    `set ds1 <`*`n`***`> remote device mgmt`**
    `<none|cafdl|caip <`*`ipaddress`***`>|ds1 `***`n`***`> [pphone]`**

    Example: set ds1 9 remote device mgmt none

    Example: set ds1 9 remote device mgmt cafdl

    Example: set ds1 9 remote device mgmt caip 192.168.201.1

    Example: set ds1 9 remote device mgmt caip 192.168.201.1 pphone

    Example: set ds1 9 remote device mgmt ds1 10

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Provision ISDN BRI 4:1 TDM Service to Subscribers

NOTE: The Access Navigator provides GR-303 support for ISDN BRI service using the 4:1 TDM mode, which combines the D (signaling) channels of four BRI connections into one DS0 channel that is statically connected to the switch. In the 4:1 TDM mode, the switch uses Call Reference Values (CRVs) to set up ISDN BRI connections.
For 3DS0 transport mode using DCS, see *Provisioning ISDN BRI Service* on page 9-3.

NOTE: Commands including `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as `ds0 4:8`. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

1. Show current drop DS0 settings with the following command:

   `show ds0` *`<n:ch>`*

   Example: show ds0 10:1-2

   The show command will display the settings for each DS0 specified. For example, the message for showing DS1 number 10, DS0 channels 1 and 2 would look similar to the following:

```
Settings for DS1 10, Channel 1:
     Type:                  GR303
     Up/Down:               UP
     CRV:                   1
     ISDN:                  B1

Settings for DS1 10, Channel 2:
     Type:                  GR303
     Up/Down:               UP
     CRV:                   1
     ISDN:                  B2
```

NOTE: In the above message, the channel type can be GR303 (voice or ISDN BRI), or private crossconnects for VOICE or DATA. Assigning an ISDN BRI to a channel will automatically change its Type to GR303.

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2. Show current ISDN BRI settings with the following command:

   `show isdn crv` *<range>*

   Example: show isdn crv 1-24

   The `show isdn` command will display the settings for each Call Reference Value (CRV) specified. For example, the message for showing ISDN CRVs 1 to 8 would look similar to the following:

```
CRV     B1                B2                D
------  ------------      ------------      ------------
1       10:1              10:2              10:24
2       10:3              10:4              10:24
3       10:5              10:6              10:24
4       10:7              10:8              10:24
5       not assigned      not assigned      10:23
6       not assigned      not assigned      10:23
7       CRV not assigned to ISDN
8       CRV not assigned to ISDN
```

NOTE: The above message shows that CRVs 1 to 4 are assigned to ISDN BRI and that their B1, B2, and D channels are connected to DS0s on drop DS1 #10.

3. If drop DS0 and ISDN BRI settings are correct, skip remaining steps.

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4. Un-assign ISDN BRI channels with the following command:

   `set ds0` *<n:ch>* **`isdn none`**

   Example: set ds0 10:10 isdn none

NOTE: In the **`set ds0 isdn`** command, the **`crv`** *<range>* modifier can only be used to assign D channel CRVs. The D channels must be assigned in groups of four, but a zero can be used as a place holder.
The B1, B2, and D channels of each ISDN BRI connection must use the same CRV.

5. Set ISDN BRI B1, B2, and D channels and CRVs with the following command:

   `set ds0` *<n:ch>* **`isdn`** *<b1|b2|d>* **`crv`** *<range>*

   Example: set ds0 10:1 isdn b1 crv 1

   Example: set ds0 10:2 isdn b2 crv 1

   Example: set ds0 10:3 isdn b1 crv 2

   Example: set ds0 10:4 isdn b2 crv 2

   Example: set ds0 10:24 isdn d crv 1,2,3,4

NOTE: If RDT provisioning is enabled in the switch, the switch can upload the ISDN CRVs and provision the ISDN D channel DS0s, without requiring a switch operator to manually enter this information into the switch database. The Access Navigator will then crossconnect the D channel switch DS0s to the drop DS0s.

6. If RDT provisioning is enabled in the switch, send the switch a request to provision the ISDN CRVs with the following command:

   `send switch provision request`

   Verify that switch has provisioned ISDN D channel DS0s:

   `show isdn database`

   Skip remaining steps.

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7. Show current ISDN BRI connections with the following command:

   `show connect` *<n>*

   Example: show connect 10

   The show connect command will display the settings for the DS1 specified. For example, the message for showing connections for DS1 #10 would look similar to the following:

```
Connections for DS1 #10 (CA DS1# 10):

From  To    Type  Interface [--> Port]
----  ----- ----- --------------------
10:01 ..... GR303
10:02 ..... GR303
10:03 ..... GR303
10:04 ..... GR303
10:05 ..... GR303
10:06 ..... GR303
10:07 ..... GR303
10:08 ..... GR303
10:09 25:17 GR303
10:10 ..... GR303
10:11 ..... GR303
10:12 ..... GR303
10:13 .....
10:14 .....
10:15 .....
10:16 .....
10:17 09:12 DATA  AcmeInternet --> V.35
10:18 09:13 DATA  AcmeInternet --> V.35
10:19 09:14 DATA  AcmeInternet --> V.35
10:20 09:15 DATA  AcmeInternet --> V.35
10:21 09:16 DATA  AcmeInternet --> V.35
10:22 09:17 DATA  AcmeInternet --> V.35
10:23 09:18 DATA  AcmeInternet --> V.35
10:24 09:19 DATA  AcmeInternet --> V.35
```

NOTE: The above message shows that DS1 #10 channels 1 to 12 are type GR303 and that channel 9 is connected to switch DS1 #25. Only ISDN BRI D channels can be statically connected to a switch DS1. DS0s carrying active calls will appear as connections to switch DS0s.

8. If drop ISDN BRI D channel connections are correct, skip remaining steps

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NOTE: To change existing ISDN BRI connections, you must first disconnect them before making new connections.

9. Disconnect existing ISDN BRI connections with the following command:

   `disconnect` *<n:ch>*

   Example: disconnect 10:9

10. Connect ISDN BRI D channel to switch DS1 with the following command:

    `connect` *<n:ch> <n:ch>*

    Example: connect 10:9 25:17

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Provision DS0s to Subscribers

NOTE: Commands including `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as `ds0 4:8`. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

1. Show current DS0 settings with the following command:

   `show ds0` *<n:ch>*

   Example: show ds0 13:1-4

   The show command will display the settings for each DS0 specified. For example, the message for showing DS1 number 13, DS0 channels 1 to 4 would look similar to the following:

```
Settings for DS1 13, Channel 1:
     Type:               GR303
     Signaling:          LOOP START
     Up/Down:            UP
     CRV:                35
     PPHONE:             Enabled
     ISDN:               None

Settings for DS1 13, Channel 2:
     Type:               GR303
     Signaling:          DID
     Up/Down:            UP
     PPHONE:             Enabled
     CRV:                36
     ISDN:               None

Settings for DS1 13, Channel 3:
     Type:               DATA
     Up/Down:            DOWN
     CRV:                No CRV assigned
     PPHONE:             Enabled
     ISDN:               None

Settings for DS1 13, Channel 4:
     Type:               GR303
     Up/Down:            UP
     CRV:                38
     PPHONE:             Enabled
     ISDN:               None
```

NOTE: In the above message, the channel type can be GR303 (voice or ISDN BRI), or private crossconnects using VOICE or DATA. P-Phone settings only appear in the Access Navigator / GR-303 Host with P-Phone. This procedure only provides steps for

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provisioning GR-303 service. See also *Provision DCS Service* on page 9-1.

2. If drop DS0 settings are correct, skip remaining steps.

NOTE: GR-303 channels use robbed-bit signaling except when carrying ISDN BRI traffic.

3. Set DS0 type to "gr303" with the following command:

   `set ds0` *<n:ch>* **`type gr303`**

   Example: set ds0 13:1-16 type gr303

NOTE: The Access Navigator/GR-303 supports GR-303 Direct Inward Dial (DID) circuit concentration on GR-303 interface groups to switches such as the Lucent 5ESS. (Two-way DOD/DID is not supported.) If the switch does not support GR-303 DID services, the DID circuits can be groomed to a DS1 going to a DID shelf in the Central Office.

4. For GR-303 Direct Inward Dial (DID), set DS0 signal to "did" with the following command:

   `set ds0` *<n:ch>* **`signal did`**

   Example: set ds0 13:2 signal did

NOTE: P-Phone service requires a remote Adit 600 on the drop DS1 and a Nortel DMS switch on the switch DS1. The remote device management must be set to CAIP with the P-Phone option enabled.

5. For P-Phone service to a remote Adit 600, set DS0 to P-Phone with the following command:

   `set ds0` *<n:ch>* **`pphone`**

   Example: set ds0 13:3 pphone

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Assign Call Reference Values (CRVs)

CAUTION! **SERVICE DISRUPTIONS CAN OCCUR IF YOU ASSIGN A CRV THAT IS ALREADY IN USE BY ANOTHER SUBSCRIBER. ALWAYS VERIFY CRVS BEFORE MAKING CHANGES. DO NOT USE THESE STEPS TO CHANGE ISDN BRI CRVS.**

NOTE: The IDT switch system will need to know the Call Reference Value (CRV) for each GR-303 DS0 voice termination. The switch uses the CRV to set up crossconnects. The CRV for each DS0 is programmable. Factory default CRVs are sequentially numbered from 1 to 768 (as shown in Figure 10-5), starting with the first DS0 channel on DS1 #1 and continuing to the last DS0 channel on DS1 #32. If required, the user can assign different CRV numbers. The only requirement is that the CRVs must be different for all assigned GR-303 voice terminations. ISDN BRI connections use the same CRV for the B1, B2, and D channel.

NOTE: A CRV with an active call can not be moved or reassigned.

NOTE: To avoid duplication when setting CRV numbers, if another channel has the same CRV number, it will be set to CRV #0 (not assigned).

1. Show current CRV settings with the following command:

   `show crv` *<range>*

   Example: show crv 1-8

   The show command will display the range of CRVs requested (up to 24), along with the DS1 and DS0 channel to which they are currently assigned. For example, the message for showing CRV numbers 1 to 8 would look similar to the following:

```
CRV         Interface               Status
---         ---------               ------
1           DS1 #1 channel 1        In Service
2           DS1 #1 channel 2        In Service
3           DS1 #1 channel 3        In Service
4           DS1 #1 channel 4        In Service
5           DS1 #2 channel 25       In Service
6           DS1 #2 channel 26       In Service
7           DS1 #2 channel 27       In Service
8           DS1 #2 channel 28       Out of Service
```


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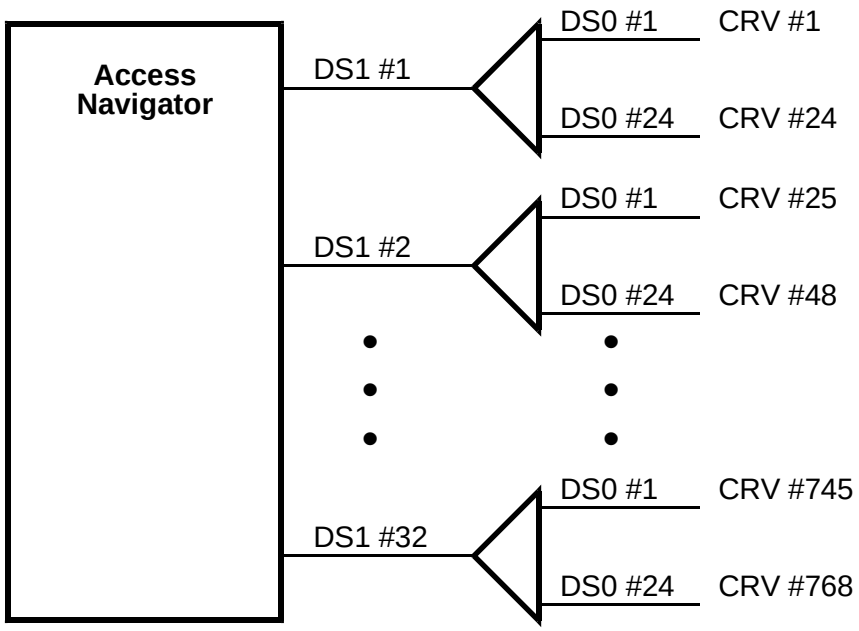

Figure 10-5. Factory Default Call Reference Values

2. If drop DS0 CRV are correct, skip remaining steps

NOTE: CRVs must be different for all assigned GR-303 voice terminations on drop DS0s. Other CRVs will be ignored.

NOTE: In the following command, there must be an equal number of channels and CRVs.

3. Set DS0 CRV range with the following command:

   `set ds0` *`<n:ch>`* **`crv`** *`<range>`*

   Example: set ds0 2:1-4 crv 118-121

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Turn Up Service

1. Show current DS1 status with the following command:

   `status ds1` *<n>*

   Example: status ds1 13

2. Show current DS0 status with the following command:

   `status ds0` *<n:ch>*

   Example: status ds0 13:1-16

3. If drop DS1 and DS0 settings are correct, skip remaining steps.

4. Set DS1s and DS0s to in-service (up) status with the following commands:

   `set ds1` *<n>* **`up`**
   `set ds0` *<n:ch>* **`up`**

   Example: set ds1 13 up

   Example: set ds0 13:1-16 up

Test Circuits

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

1. Follow standard practices to test subscriber drop DS1 circuits.
2. Follow standard practices to test DS0 connections.

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CHAPTER 11

Provision Remote Access Bank II

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Remote Access Bank II Provisioning Overview

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This procedure covers remote provisioning of Carrier Access' Access Bank® II (ABII) family of T1 CSU channel bank products, including the Access Bank II/SNMP and the Access Bank II/SDSL. The Access Navigator can provision voice and data services through a remote Access Bank II, which may include one or more of the following interfaces: Analog voice, RS-232, T1 Drop, SDSL, and V.35.

The Carrier Access remote configuration provisioning feature enables the operator to remotely provision voice and data services at any time, even before the Access Bank II is installed on the customer premises. When the Access Bank II is installed and powered up, the Access Navigator, when configured for Carrier Access FDL (cafdl) remote management, automatically senses the DS1 connection and downloads provisioning data over the FDL channel of the T1 line.

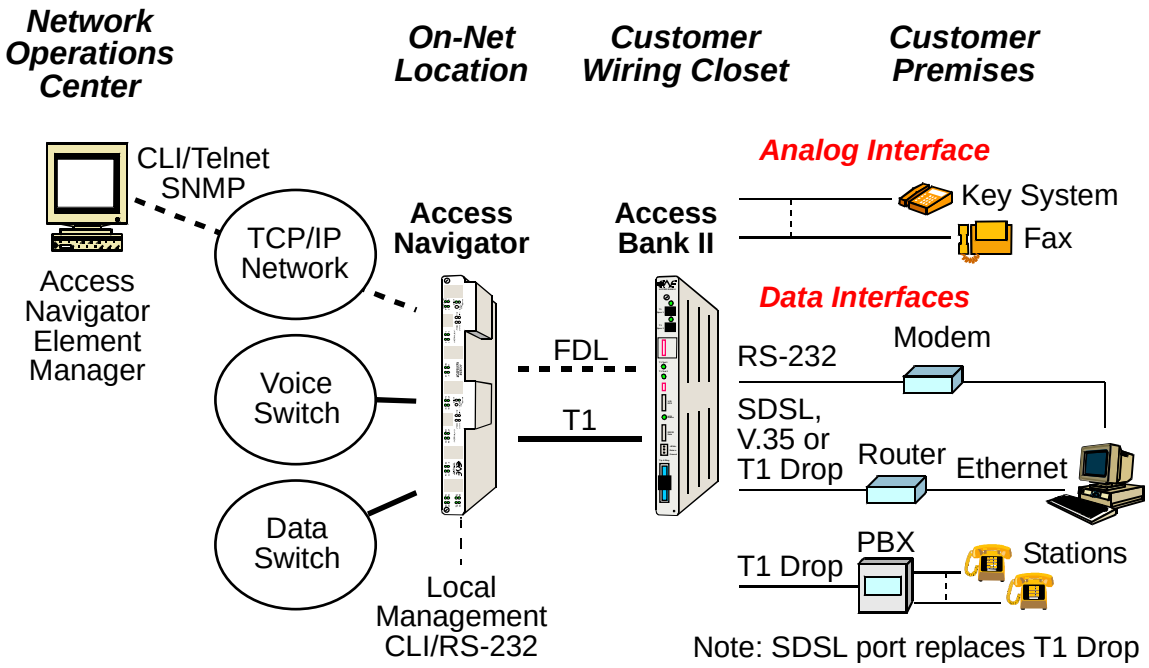

Figure 11-1 Access Bank II Voice and Data Services

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Pre-Provisioning and Testing

The Access Navigator's flow-through provisioning feature enables the operator to remotely provision Access Bank II voice and data services. These services can be provisioned at any time, even before the Access Bank II is installed on the customer premises. When the unit is installed and powered up, the Access Navigator automatically senses the DS1/T1 connection and downloads provisioning data through the out-of-band Facility Data Link (FDL).

Requirements

NOTE: T1 Type 1 facilities are recommended for reliable remote management. Type 2 facilities – in which the T1 is transported across other carrier networks – may not be reliable because the FDL channel can be used or disabled by the other carriers.

Remote provisioning requires that **all** Access Bank II voice and data services be provisioned through the Access Navigator, since local changes can not be remotely tracked and will be erased by remote downloads.

For remote provisioning, the DS1 drop on the Access Navigator must be provisioned for ESF framing, B8ZS line code, and Carrier Access FDL (CAFDL) remote management. On the Access Bank II, the T1 interface must be set to ESF framing, B8ZS line code, and PRM protocol AT&T "54016", which are the default settings.

To support remote provisioning, the Access Bank II family requires Controller card software versions between 2.21 and 2.99. Software upgrades for versions 2.00 through 2.20 are available through the distributor or dealer from which you purchased the Access Bank II. Hardware and software upgrades are required for even older Controllers. To display the software version, connect the Access Bank II to your computer with CA's Remote Monitor software, select the "Maintenance, DIP Switches" tab, and either click the "Read Current Screen from Access Bank 2" icon or click the "Read Current Screen from Unit" from the "Connection" dropdown menu.

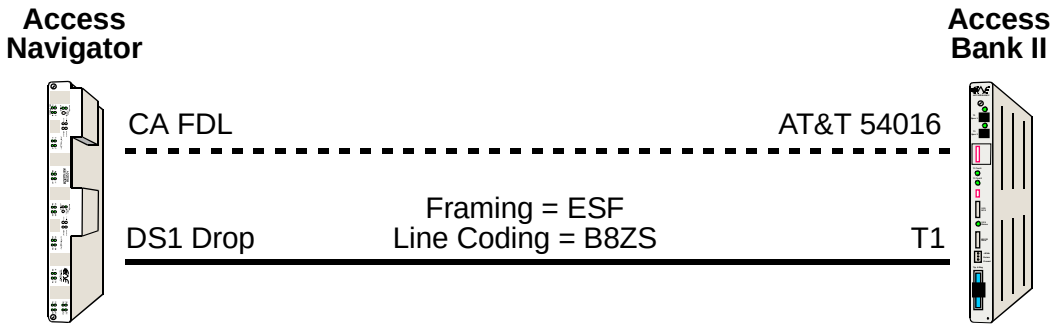

Figure 11-2 Access Bank II Remote Management Interface

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Analog Interfaces

The Access Bank II family of channel bank products can be equipped with one or two analog voice cards installed in card slots FX#1 and FX#2. Analog cards include Foreign Exchange Station (FXS), Foreign Exchange Office (FXO), 4-wire E&M, and Special POTS (SPOTS). Each card provides 12 analog channels for connection to the customer's PBX, Key Systems, fax machines, modems, and other analog voice terminations. Analog channels 1 to 12 are located on the card in slot FX#1, and channels 13 to 24 are located on the card in slot FX#2.

The Access Navigator uses a fixed mapping between the T1 DS0s and the analog channels. If no remote interfaces are used, DS0 channels 1 to 24 will be connected to analog channels 1 to 24. If a DS0 is connected to a remote interface, the corresponding analog channel will not be used. For example, if DS0 channel 15 is connected to a remote interface, analog channel 15 will not be used.

The Access Navigator currently supports remote provisioning of the following Access Bank II interfaces:

- FX cards providing up to 24 analog voice terminations (12 per card)
- RS-232 port for data service up to 57.6 Kbps between two Access Bank II's
- SDSL port for high-speed data service up to 1 Mbps (replaces T1 Drop port)
- T1 Drop port for PBX voice or high-speed data service
- V.35 port for high-speed data service

Crossconnect Features

The Access Bank II contains DS0 crossconnect switches that are remotely controllable. This enables the Access Navigator to set up connections between the DS1 drop DS0s and the various Access Bank II voice and data interfaces. Internal crossconnections can also be made between the Access Bank's T1 Drop port and other remote interfaces, such as the V.35 port.

The operator specifies which DS0s on the DS1 to use for the RS-232, T1 drop, V.35, and other remote interfaces using special **`set remote`** commands. The Access Navigator automatically connects any remaining voice or GR-303 DS0s to the FX interfaces, which are provisioned using the standard **`set ds0`** commands. Since the factory default does not define any remote interfaces, DS0 channels 1 to 24 are initially connected to FX channels 1 to 24 (see **A** in Figure 11-3).

The Access Navigator only allows crossconnects between compatible voice, data, and GR-303 types, as shown in Table 11-1. Invalid crossconnects in the table are grayed out.

Remote interfaces require two commands for provisioning crossconnects. The **`add interface`** command creates a fractional interface and defines the DS0s it will use. Then the **`connect remote`** command connects the fractional interface to a remote interface port on the Access Bank II, such as the V.35 interface. This can produce crossconnections similar to example **B** in Figure 11-3).

To make an internal crossconnection between the T1 Drop and another remote interface, use the **`add interface`** command to create a **`remote`** interface type. Then use the **`connect remote`** command to connect the remote T1 Drop interface to another port, such as the FX or V.35.

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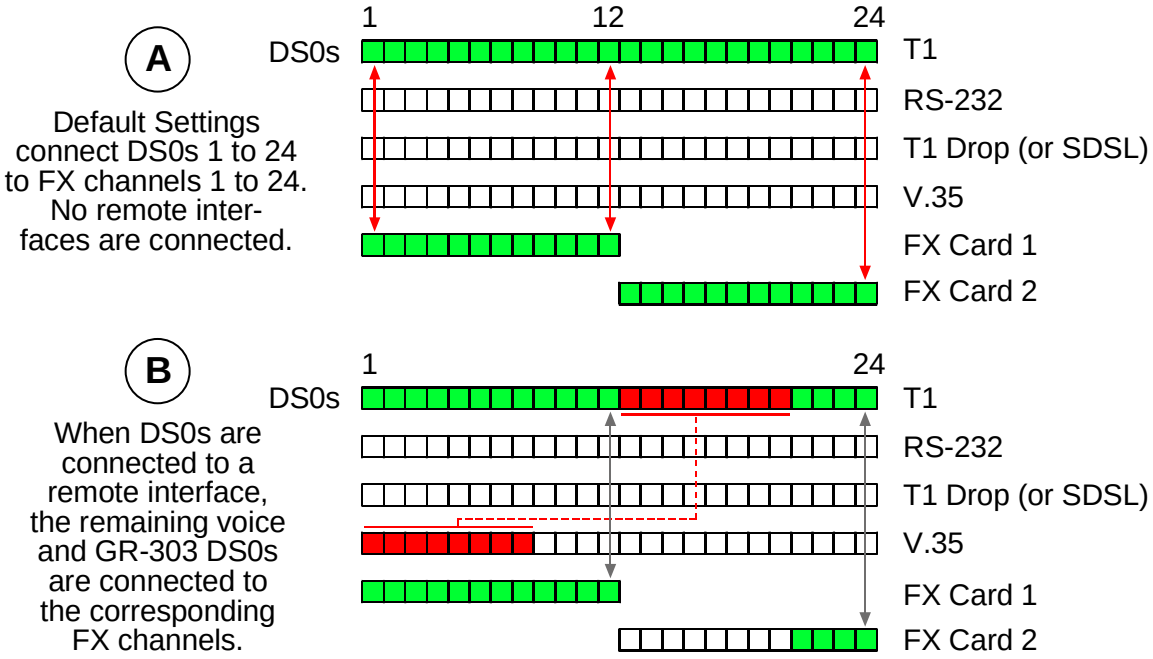

Figure 11-3 Crossconnections (ABII)

Table 11-1 Valid Crossconnect Assignments

	Access Navigator Drop DS0 Type		
ABII Remote Port	**Voice**	**Data**	**GR-303**
FX analog	Valid		Valid
RS-232		Valid	
SDSL		Valid	
T1 Drop	Valid	Valid	Valid
V.35		Valid	

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FX Analog Interfaces

NOTE: Provisioning FX service uses the same DS0 provisioning commands as for other analog terminations. Because of restrictions on some DS0 parameters, these commands are repeated below with additional notes.

Access Navigator DS0 signaling must be either loop start (LS) or ground start (GS). Access Bank II FX card switches Option A, Option B, and Option C must all be set to the OFF position for LS and GS operation with automatic detection. (This is the default setting.)

The Access Bank II family of channel bank products can be equipped with one or two FX cards, including Foreign Exchange Station (FXS) and Foreign Exchange Office (FXO). Each FX card provides 12 analog channels for connection to the customer's PBX, Key Systems, fax machines, modems, and other analog voice terminations (see Figure 11-4).

The Access Navigator connects any unassigned voice or GR-303 DS0s to the FX interface. If no remote interfaces are used, DS0 channels 1 to 24 will be connected to FX channels 1 to 24, as in example **A** in Figure 11-3. If you connect DS0s to a remote interface, the Access Navigator will connect the remaining voice or GR-303 DS0s to the FX channels, as in example **B** in Figure 11-3.

The Access Navigator uses a fixed mapping between the T1 DS0s and FX channels, as in example **B** in Figure 11-3. This allows the carrier to pre-wire all phone lines during installation and turn up only the required service. Additional lines can then be remotely turned up as needed, without affecting service to previous lines.

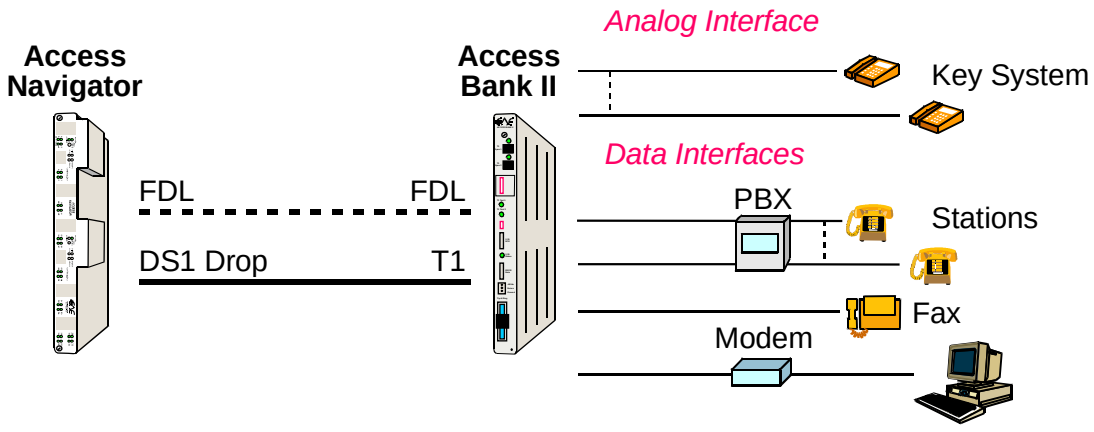

Figure 11-4 FX Interfaces Support Analog Voice and Data Services

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Fractional Interfaces

A fractional interface is a group of sequential DS0s in the same DS1, such as DS0s 19 through 24. A fractional interface must be used to connect DS0s to a remote interface.

Each Access Navigator can support up to 64 fractional interfaces. Each DS1 can have several fractional interfaces, but each remote SDSL, RS-232, or V.35 port can be connected to only one fractional interface. A T1 Drop port can be connected to several fractional interfaces to support voice, data, and GR-303 traffic using different DS0s.

Fractional interfaces must be defined as data, voice, or GR-303. Data and voice interfaces carry DCS service. To carry GR-303 voice service, the Access Navigator must have the GR-303 option to make connections to a GR-303 IDT switch.

To be a valid assignment, the interface type must be compatible with the DS1 and DS0 type, as shown in Table 11-2 For example, a voice type interface can only be assigned to voice type DS0s on a voice type DS1. Invalid combinations in the table are grayed out.

The Access Navigator makes it easy to identify and work with fractional interfaces. The **`add interface`** command allows the operator to give the fractional interface a meaningful name for easy recognition. Names also make CLI commands simpler to use. Only one command, **`connect remote`**, is needed to connect the DS0s between a fractional interface and the remote interface port.

Table 11-2 Valid Interface Assignments

		Interface Type		
DS1 Type	**DS0 Type**	**Voice**	**Data**	**GR-303**
Drop	Voice	Valid		
	Data		Valid	
	GR-303			Valid
Groom	Voice	Valid		
	Data		Valid	
	GR-303			
Switch	Voice			
	Data			
	GR-303			

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Remote Interfaces

The Access Bank II family can provide a variety of remote interface ports for voice and data services. Using **`set remote`** commands, the operator can remotely configure the settings of each interface to meet customer requirements. The following remote interfaces are available, depending on the specific product:

- RS-232 Port – an RS-232 DTE customer interface for connection to a DS0 channel in the DS1 drop. This port supports baud rates from 1,200 to 57,600 between two Access Bank II's and uses a special format to transport asynchronous data over the synchronous DS0 channel.
- SDSL Port – a high-speed data network interface for connection to a SDSL router. The data rate depends on the number of DS0s (up to 16) assigned to the port. SDSL routers have automatic configuration, so no interface settings are required.
- T1 Drop Port – a second T1 port for connection to a T1 router or T1 PBX. The Access Bank II cross-connects DS0s between its T1 Drop and T1 access line (same as the DS1 drop). DS0s on the DS1 drop are assigned by the **`add interface`** command. DS0s on the T1 Drop are always in sequential order, starting at 1.
- V.35 Port – a high-speed data network interface for connection to a V.35 router. The data rate depends on the number of DS0s assigned to the V.35 port. If the router does not include automatic rate sensing, it will have to be manually programmed for the required data rate.

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Remote Access Bank II Provisioning Quick Guide

NOTE: Do not locally provision the Access Bank II if you are remotely provisioning it through the Access Navigator. Local changes made to the Access Bank II will not be recorded in the Access Navigator data base. Consequently, any local changes will be overwritten when the Access Navigator downloads configuration settings.

Related Commands	**Access Bank II Provisioning Items**
set remote <*n*> **config off**	Temporarily disable configuration downloading to remote Access Bank II.
set ds1 <*n*> **type drop** **set ds1** <*n*> **framing esf** **set ds1** <*n*> **linecode b8zs** **set ds1** <*n*> **remote mgmt cafdl** **set ds1** <*n*> **lbo** <*setting*> **set ds1** <*n*> **loopdetect off** **set ds1** <*n*> **id** <*"name"*> **set remote** <*n*> **id** <*"name"*>	Provision DS1 service to remote, including remote management interface.
set ds0 <*n:ch*> **type** <*setting*> **set ds0** <*n:ch*> **signaling** <*setting*> **set ds0** <*n:ch*> **crv** <*setting*> **set ds0** <*n:ch*> **up**	Provision DS0 service to remote.
connect <*n:ch*> <*n:ch*> **disconnect** <*n:ch*>	Provision DCS crossconnects to remote.
read remote <*n*> **connections** **read remote** <*n*> **rs232** **read remote** <*n*> **t1** **read remote** <*n*> **t1drop** **read remote** <*n*> **v35**	Read remote DS0 connections and interface settings. Note: SDSL interface port has no settings to read.
add interface <*"name"*> <*n:ch*>	Create fractional interface and assign DS0s to be used.
set remote <*n*> **rs232** <*setting*> **set remote** <*n*> **t1drop** <*setting*> **set remote** <*n*> **v35** <*setting*>	Configure remote interface port to meet customer requirements.
connect remote <*"name"*> <*port*> **disconnect remote** <*"name"*>	Connect fractional interface to remote interface port.
set remote <*n*> **config on** **set ds1** <*n*> **up**	Download configuration and turn up service.

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Remote Access Bank II Maintenance Quick Guide

In addition to reading configuration data from the remote Access Bank II, the Access Navigator includes maintenance commands that can remotely read Access Bank II alarms and event logs, set remote interface loopbacks, and reset the remote system.

Related Commands	Access Bank II Maintenance Tasks
read remote <*n*> **alarms**	Remote alarms.
read remote <*n*> **log** **clear remote** <*n*> **log**	Remote log events.
read remote <*n*> **equipment**	Remote equipment list.
read remote <*n*> **loopback**	Remote loopback status.
send remote <*n*> **loopdown** **send remote** <*n*> **rs232 line loopup** **send remote** <*n*> **rs232 tsi loopup** **send remote** <*n*> **sdsl payload loopup** **send remote** <*n*> **t1 payload loopup** **send remote** <*n*> **t1 tsi loopup** **send remote** <*n*> **t1drop line loopup** **send remote** <*n*> **t1drop payload loopup** **send remote** <*n*> **t1drop tsi loopup** **send remote** <*n*> **v35 line loopup** **send remote** <*n*> **v35 tsi loopup**	Remote interface loopbacks. Note: **loopdown** command disables remote **loopup**.
reset remote <*n*>	Reset remote.

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Obtain Provisioning Information

1. Obtain office records for installation site.
2. Obtain circuit orders for remote Access Bank II service turn up.

Verify System Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch. Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to voice.

1. Start management session (see *Start Management Session* on page 7-1).
2. Show system equipment configuration with the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status       Version
---------        ------       -------
Controller A     Active       01.70 GR-303 Option
Controller B     Standby      01.70 GR-303 Option
DS1 Card 1       Installed     1
DS1 Card 2       Installed     1
DS1 Card 3       Installed     1
DS1 Card 4       Installed     1
DS1 Card 5       Installed     1
DS1 Card 6       Installed     1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

3. Verify number of DS1 circuits installed by comparing equipment status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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4. Show current DS1 service status with the following command:

   `show ds1 all`

   A message similar to the following will appear, showing the link up/down service status of all DS1s in the Access Navigator, as well as certain other parameters of common interest in trouble-shooting.

```
                                                                  Remote
                                          Line          Term      Device
Circuit ID                 Link Type      Code Framing   ID   FDL    Mgmt
----------                 ---- ------    ---- -------  ---- -----  ------
CA DS1# 01                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 02                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 03                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 04                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 05                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 06                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 07                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 08                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 09                 UP   DROP      B8ZS   ESF          None   CA FDL
CA DS1# 10                 UP   DROP      B8ZS   ESF          None   CA IP
CA DS1# 11                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 12                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 13                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 14                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 15                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 16                 UP   DROP      AMI    D4           None   None
CA DS1# 17                 UP   DROP      AMI    D4           None   None
CA DS1# 18                 UP   DROP      B8ZS   SLC96        None   SLC96
CA DS1# 19                 UP   DROP      B8ZS   SLC96        None   None
CA DS1# 20                 UP   DROP      B8ZS   ESF          T1403  None
CA DS1# 21                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 22                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 23                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 24                 DOWN DROP      B8ZS   ESF          None   None
CA DS1# 25                 DOWN SWITCH    B8ZS   ESF     1    None   None
CA DS1# 26                 DOWN SWITCH    B8ZS   ESF     3    None   None
CA DS1# 27                 DOWN SWITCH    B8ZS   ESF     4    None   None
CA DS1# 28                 DOWN SWITCH    B8ZS   ESF     5    None   None
CA DS1# 29                 DOWN SWITCH    B8ZS   ESF     2    None   None
CA DS1# 30                 DOWN SWITCH    B8ZS   ESF     6    None   None
CA DS1# 31                 DOWN SWITCH    B8ZS   ESF     7    None   None
CA DS1# 32                 UP   GROOM     B8ZS   ESF          None   None
```

NOTE: In the above message, the DS1 type may be drop, groom, or switch. The "switch" type will appear only in Access Navigator versions with the GR-303 Option. The line termination identifier (TermID) is used only for communicating over the EOC and TMC with the GR-303 switch.

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5. Verify number of DS1s already in service (link is up) by comparing DS1 link status with office records. If there is a discrepancy, follow standard practices to resolve problem.

NOTE: Commands such as `ds1 <n>` require the operator to enter a DS1 number or range of numbers. For example, DS1 #6 is entered as `ds1 6`. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing `ds1 1-8`.

6. Show current DS1 status with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status ds1` <*n*>

   Example: status ds1 1

   This command will produce a message listing the status of the specified DS1 or range of DS1s. For example, the message for DS1 #1 and #29 might look similar to the following. Note that the message for DS1 #1 shows the DS1 is in service, while the message for DS1 #29 indicates there is no Quad Framer circuit card installed.

```
Status for DS1 1:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  In use as DROP
    FDL Type:               CAC
    FDL Status:             Up

Status for DS1 29:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  Card Not Installed
```

7. Verify status of DS1 lines to be turned up by comparing DS1 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

NOTE: Commands such as `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

8. Display current DS0 status with the following command, where <*n:ch*> is the DS0 or range of DS0s in the DS1 to be turned up:

   `status ds0` <*n:ch*>

   Example: status ds0 1:1-4

   Example: status ds0 32:1-4

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The status command will display the status for each DS0 specified and will look similar to the following:

```
Interface               Status
---------               ------
DS1 1 Channel 1         In Service
DS1 1 Channel 2         In Service
DS1 1 Channel 3         In Service
DS1 1 Channel 4         Out of Service

DS1 32 Channel 1        Card Not Installed
DS1 32 Channel 2        Card Not Installed
DS1 32 Channel 3        Card Not Installed
DS1 32 Channel 4        Card Not Installed
```

9. Verify status of DS0 circuits on DS1 lines to be turned up by comparing DS0 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

Temporarily Disable Configuration Downloading

NOTE: To speed up the provisioning of remote services, temporarily turn off remote configuration downloading to the Access Bank II. When finished, turn remote configuration on again, and the Access Navigator will download all changes at once. Downloading to each Access Bank II can take up to one minute. The `status remote` command will report "FDL tx in progress" during transmission and "FDL in service as CAC" when transmission is complete.

Turn off remote configuration downloading with the following command:

`set remote` <*n*> **`config off`**

Example: set remote 10 config off

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Provision Drop DS1 to Remote Access Bank II

NOTE: This is the T1 connection between the Access Navigator and Access Bank II.

1. Show drop DS1 settings with the following command:

   show ds1 <*n*>

   Example: show ds1 10

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 10 might look similar to the following:

```
Settings for DS1 10:
     Circuit ID:              CA DS1# 10
     Up/Down:                 DOWN
     Framing:                 ESF
     Line Coding:             B8ZS
     Type:                    DROP
     Clock Source:            NORMAL
     Line Build Out:          DSX-1 EQUAL. FOR 0-133 ft.
     Loop Code Detection:     OFF
     Loop Back                OFF
     Line Termination ID:     0 (for switch DS1s only)
     FDL Type:                CAC
     FDL Status:              UP
     Bit Error Rate:          2.31425e-4
```

NOTE: In the above message the loop back test function is turned off during normal service. Line Termination IDs are used only for GR-303 switch DS1s. FDL Status does not appear if FDL Type is none. Bit Error Rate appears only if test pattern is present.

2. If drop DS1 settings are correct, skip remaining steps.

3. Set DS1 type to “drop” with the following command:

   set ds1 <*n*> **type drop**

   Example: set ds1 25 type drop

4. Set drop DS1 frame type to ESF with the following command:

   set ds1 <*n*> **framing esf**

   Example: set ds1 25 framing esf

5. Set drop DS1 line code to B8ZS with the following command:

   set ds1 <*n*> **linecode b8zs**

   Example: set ds1 25 linecode b8zs

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6. Set DS1 remote device management type to Carrier Access FDL with the following command:

   `set ds1 <n> remote device management cafdl`

7. Set drop DS1 clock source to normal or loop with the following command:

   `set ds1 <n> clock <normal|loop>`

   Example: set ds1 25 clock normal

8. Set drop DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation with the following command:

   `set ds1 <n> lbo <setting>`

   Example: set ds1 25 lbo 8

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop code detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Loop detection is normally turned off for DS1 drops.

9. Set drop DS1 loop request code detection to on or off with the following command:

   `set ds1 <n> loopdetect <on|off>`

   Example: set ds1 25 loopdetect on

10. Set drop DS1 circuit ID with the following command:

    `set ds1 <n> id <"id">`

    Example: set ds1 25 id "DS1#25"

    The ID may contain up to 30 characters and must be enclosed in quote marks.

11. Set remote terminal identification with the following command:

    `set remote <n> id <"name">`

    Example: set remote 10 id "Acme Corp"

    The remote ID may contain up to 32 characters and must be enclosed in quote marks.

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Test DS1 Circuits

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

Follow standard practices to test subscriber drop DS1 circuits.

Provision DS0s

NOTE: The Access Navigator configures crossconnections inside the Access Bank II. The user can specify which DS0s to use for the RS-232, T1 drop, or V.35 remote interfaces. The Access Navigator connects any unassigned voice or GR-303 DS0s to the analog interface. If you connect DS0s to a remote interface, the Access Navigator will connect the remaining voice or GR-303 DS0s to the analog channels.

The Access Navigator uses a fixed mapping between the T1 DS0s and the analog channels. This permits unused analog lines to be pre-wired and turned up when needed. If no remote interfaces are used, DS0 channels 1 to 24 will be connected to analog channels 1 to 24. If a DS0 is connected to a remote interface, the corresponding analog channel will not be used. For example, if DS0 channel 15 is connected to a remote interface, analog channel 15 will not be used.

NOTE: Commands such as `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

1. Show current DS0 settings with the following command:

   `show ds0` *<n:ch>*

   Example: show ds0 25:1-4

   The show command will produce a status message for each DS1 specified. For example, the message for DS1 number 25, DS0 channels 1 to 4 would look similar to the following:

   ```
   Settings for DS1 13, Channel 1:
   ```


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```
     Type:              GR303
     Signaling:         LOOP START
     Up/Down:           DOWN

Settings for DS1 13, Channel 2:
     Type:              GR303
     Signaling:         LOOP START
     Up/Down:           DOWN

Settings for DS1 13, Channel 3:
     Type:              VOICE
     Signaling:         GROUND START
     Up/Down:           DOWN

Settings for DS1 13, Channel 4:
     Type:              DATA
     Up/Down:           DOWN
```

2. If drop DS0 settings are correct, skip remaining steps.

NOTE: GR-303 and DS0 voice channels use robbed-bit signaling, while DS0 data is clear channel.

3. Set DS0 type to voice, data, or GR-303 with the following command:

   set ds0 <*n:ch*> **type** <*voice*|*data*|*gr303*>

   Example: set ds0 25:1-18 type voice

   Example: set ds0 25:19-24 type data

NOTE: The Access Bank II supports one or two analog cards (12 channels per card). The default analog setting provides automatic ground start/loop start detection and translation for each analog channel. If E&M signaling is required, the DIP switches on the analog card must be set for E&M signaling, which applies to all channels on the card.

4. Set DS0 signaling (voice only) to Loop Start (ls), Ground Start (gs), or E&M (em) signaling with the following command:

   set ds0 <*n:ch*> **signal** <*ls*|*gs*|*em*>

   Example: set ds0 25:1-18 signal gs

5. Set DS0s to in-service (up) status with the following command:

   set ds0 <*n:ch*> **up**

   Example: set ds0 11:1-16 up

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Provision DS0 Crossconnects

1. Show current crossconnect settings with the following command:

   `show connect` *<n>*

   Example: show connect 11

   The show command will display the current settings for the specified DS1. For example, the message for DS1 number 11 would look similar to the following:

```
Connections for DS1 #11 (CA DS1# 11):

From    To    Type   Interface [--> Port]
----   -----  -----  --------------------
11:01  .....  GR303
11:02  .....  GR303
11:03  .....  GR303
11:04  .....  GR303
11:05  .....  GR303
11:06  .....  GR303
11:07  .....  GR303
11:08  .....  GR303
11:09  .....  GR303
11:10  .....  GR303
11:11  .....  GR303
11:12  .....  GR303
11:13  .....
11:14  .....
11:15  .....
11:16  .....
11:17  09:12  DATA   AcmeInternet --> V.35
11:18  09:13  DATA   AcmeInternet --> V.35
11:19  09:14  DATA   AcmeInternet --> V.35
11:20  09:15  DATA   AcmeInternet --> V.35
11:21  09:16  DATA   AcmeInternet --> V.35
11:22  09:17  DATA   AcmeInternet --> V.35
11:23  09:18  DATA   AcmeInternet --> V.35
11:24  09:19  DATA   AcmeInternet --> V.35
```

2. If DS0 crossconnect settings are correct, skip remaining steps.

NOTE: To change existing DS0 connections, you must first disconnect them before making new connections.

3. Disconnect existing DS0s with the following command:

   `disconnect` *<n:ch>*

   Example: disconnect 25:1-24

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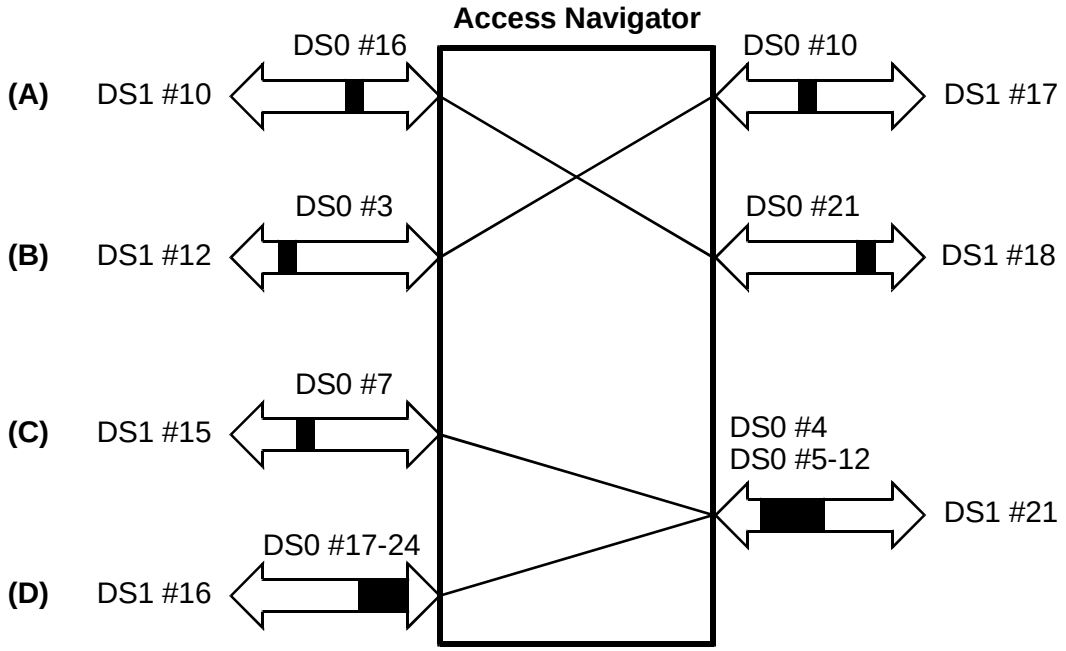
4. Connect DS0s (see Figure 1) to make 2-way connections between DS0s, or fractional groups of DS0s, with the following command:

   `connect` *<n:ch> <n:ch>*

   Example: connect 25:19-24 5:1-6



Command Examples: (A) connect ds0 10:16 18:21
(B) connect ds0 12:3 17:10
(C) connect ds0 15:7 21:4
(D) connect ds0 16:17-24 21:5-12

Figure 11-5 Crossconnect Examples

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Create Fractional Interfaces (if required)

NOTE: A fractional interface must be created for each Access Bank II remote port (RS-232, T1 Drop, or V.35) to be turned up. If these interfaces are not required, go to *Download Configuration to Remote Access Bank II* on page 11-28.

1. Verify fractional interface settings with the following command:

   `show interface all`

   Example: show interface all

   Example: show interface acmet1

   The show command will produce a message showing the interface settings. For example, the messages for the AcmeT1 and AcmeV35 interfaces might look similar to the following:

```
Settings for Interface AcmeT1
     Interface Channels:     9:13-18
     Interface Index:        1
     Remote Device Type:     T1Drop
     Interface Type:         Voice

Settings for Interface AcmeV35
     Interface Channels:     9:19-24
     Interface Index:        2
     Remote Device Type:     V35
     Interface Type:         Data
```

2. If interface settings are correct, skip remaining steps.

3. If any interface DS0s must be changed, remove the old interface with the following command:

   `delete interface` *<"name">*

   Example: remove interface "AcmeT1drop"

4. Add a new fractional interface for voice, data, or GR-303 service for the desired DS0s with the following command:

   `add interface` *<"name"> <n:ch> <voice|data|gr303>*

   Example: add interface "AcmeT1" 9:13-18 voice

   The interface name may contain up to 18 characters and must be enclosed in quote marks.

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Configure Remote RS-232 Interface (if used)

NOTE: The RS-232 interface supports baud rates from 1,200 to 57,600 between two Access Bank II's and uses a special format to transport asynchronous data over the synchronous DS0 channel.

1. Show current remote interface settings with the following command:

   `show remote` *<n|all>*

   Example: show remote 11

   Example: show remote all

   The show command will display the remote interface settings the each DS1 specified, or for all DS1s. For example, the message for showing DS1 number 11 would look similar to the following:

```
Settings for remote device Remote Device #11:
     Remote Config:      enabled
     T1 Drop Port:
       Line Coding:      AMI
       Framing:          D4
       Line Build Out:   DSX-1 0-133 ft. (or 0 db)
       PRM:              AT&T
     V.35 Port:
       CTS:              Always High
       Rx Timing:        Internal
       Clock Inversion:  None
       Data Inversion:   Normal
       Speed:            Nx64
       DSU:              On
     RS232 Port:
       Baud Rate:        9,600
       Data Bits:        8
       Parity:           None
       Stop Bits:        1
```

2. If remote RS-232 interface settings are correct, skip remaining steps

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3. Set baud rate with the following command:

   `set remote` *<n>* **`rs232 baud`** *<setting>*

   Example: set remote 11 rs232 baud 9600

   Available baud settings are: 1200, 2400, 4800, 9600, 19200, 38400, 57600.

4. Set number of data bits and parity with the following command:

   `set remote` *<n>* **`rs232 data`** *<e7|o7|n8>*

   Example: set remote 11 rs232 data n8

5. Set number of stop bits with the following command:

   `set remote` *<n>* **`rs232 stop`** *<1|2>*

   Example: set remote 11 rs232 stop 1

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Configure Remote T1 Drop Interface (if used)

CAUTION! **IF THE T1 DROP WILL BE USED, THE T1 DROP CIRCUIT OR LOOPBACK MUST BE INSTALLED BEFORE DOWNLOADING THE CONFIGURATION, OTHERWISE THE RESULTING AIS ALARM WILL TAKE DOWN THE FDL COMMUNICATIONS LINK UNTIL THE CIRCUIT IS INSTALLED AND THE ALARM IS CLEARED.**

NOTE: This is a second T1 connection on the Access Bank II, not the T1 connection between the Access Navigator and the Access Bank II.

1. Show current remote interface settings with the following command:

   `show remote` *<n|all>*

   Example: show remote 11

   Example: show remote all

   The show command will display the remote interface settings the each DS1 specified, or for all DS1s. For example, the message for showing DS1 number 11 would look similar to the following:

```
Settings for remote device Remote Device #11:
     Remote Config:      disabled
     T1 Drop Port:
       Line Coding:      AMI
       Framing:          D4
       Line Build Out:   DSX-1 0-133 ft. (or 0 db)
       PRM:              AT&T
     V.35 Port:
       CTS:              Always High
       Rx Timing:        Internal
       Clock Inversion:  None
       Data Inversion:   Normal
       Speed:            Nx64
       DSU:              On
     RS232 Port:
       Baud Rate:        9,600
       Data Bits:        8
       Parity:           None
       Stop Bits:        1
```

2. If drop T1 Drop settings are correct, skip remaining steps.

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3. Set remote T1 Drop framing to D4 (SF) or ESF with the following command:

   `set remote` *<n>* **`t1drop framing`** *<d4|esf>*

   Example: set remote 11 t1drop framing d4

4. Set remote T1 Drop line buildout (lbo) to the required DSX-1 equalization or CSU attenuation with the following command:

   `set remote` *<n>* **`t1drop lbo`** *<setting>*

   Example: set remote 11 t1drop lbo 1

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

5. Set remote T1 Drop line coding to AMI (alternate mark inversion) or B8ZS (binary 8 zero substitution with the following command:

   `set remote` *<n>* **`t1drop linecode`** *<ami|b8zs>*

   Example: set remote 11 t1drop linecode b8zs

6. Set remote T1 Drop performance message (PRM) format to A&T 54016 or ANSI T1.402 with the following command:

   `set remote` *<n>* **`t1drop prm`** *<ansi|att>*

   Example: set remote 11 t1drop prm att

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Configure Remote V.35 Interface (if used)

1. Show current remote interface settings with the following command:

   show remote <*n*|*all*>

   Example: show remote 11

   Example: show remote all

   The show command will display the remote interface settings the each DS1 specified, or for all DS1s. For example, the message for showing DS1 number 11 would look similar to the following:

```
Settings for remote device Remote Device #11:
     Remote Config:      enabled
     T1 Drop Port:
       Line Coding:      AMI
       Framing:          D4
       Line Build Out:   DSX-1 0-133 ft. (or 0 db)
       PRM:              AT&T
     V.35 Port:
       CTS:              Always High
       Rx Timing:        Internal
       Clock Inversion:  None
       Data Inversion:   Normal
       Speed:            Nx64
       DSU:              On
     RS232 Port:
       Baud Rate:        9,600
       Data Bits:        8
       Parity:           None
       Stop Bits:        1
```

2. If drop V.35 settings are correct, skip remaining steps.

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3. Set remote V.35 clock receive and transmit clock polarity to invert the receive (rx), transmit (tx), receive and transmit (rxtx), or neither (none) with the following command:

   set remote <*n*> **v35 clkinv** <*rx|tx|rxtx|none*>

   Example: set remote 11 v35 clkinv rx

4. Set remote V.35 CTS Clear to Send (CTS) timing and signal levels for flow control with the following command:

   set remote <*n*> **v35 cts** <*cd|high|low|rts*>

   Example: set remote v35 cts high

   The CTS logic signal can be always high or low, or set to follow the Carrier Detect (CD) or Ready to Send (RTS) signals.

5. Set remote V.35 data polarity with the following command:

   set remote <*n*> **v35 data** <*invert|normal*>

   Example: set remote v35 data normal

6. Set remote V.35 receive clock source to internal or external with the following command:

   set remote <*n*> **v35 rxclk** <*int|ext*>

   Example: set remote v35 data normal

   Internal clock source timing is recommended. This setting prevents data slips by synchronizing the receive timing to the T1 interface.

7. Set remote V.35 speed to Nx56 or Nx64 Kbps with the following command:

   set remote <*n*> **v35 speed** <*nx56|nx64*>

   Example: set remote v35 speed nx64

8. Set remote V.35 DSU loopback code detection to on or off with the following command:

   set remote <*n*> **v35 dsu** <*on|off*>

   Example: set remote v35 dsu on

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Connect Fractional Interface to Remote Interface

NOTE: The `connect remote` command configures the DS0 crossconnections inside the Access Bank II, using the DS0s defined by the interface names. This produces crossconnections between the Access Navigator DS1 drop DS0s and the Access Bank II remote interface ports.

1. Remove old interface connection if connection must be changed with the following command:

   `disconnect remote` *<"name">*

   Example: disconnect remote "AcmeT1drop"

2. Connect fractional interface to remote RS-232, SDSL, T1 Drop, or V.35 interface port with the following command:

   `connect remote` *<"name"> <rs232|sdsl|t1drop|v35>*

   Example: connect remote "AcmeT1" t1drop

Download Configuration to Remote Access Bank II

NOTE: When downloading remote configuration settings, the `status remote` command will report “FDL tx in progress” during transmission and “FDL in service as CAC” when transmission is complete.

Turn on remote configuration to download changes with the following command:

`set remote` *<n>* **`config on`**

Example: set remote 11 config on

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Verify Downloaded Settings (optional)

NOTE: All `read remote` commands require that the remote Access Bank II is operational and connected to an Access Navigator drop DS1 using CAC FDL protocol. If configuration downloading is enabled, the `read remote` and `show remote` settings and connections should be the same.

1. Verify downloaded interface settings, if desired, with the following command:

   `read remote` *<n> <rs232|t1drop|v35>*

   Example: read remote 11 t1drop

2. Verify downloaded crossconnections, if desired, with the following command:

   `read remote` *<n>* **`connections`**

   Example: read remote 11 connections

Turn Up Service

1. Set DS1s to in-service (up) status with the following commands:

   `set ds1` *<n>* **`up`**

   Example: set ds1 11 up

2. Show current DS1 status with the following command:

   `status ds1` *<n>*

   Example: status ds1 13

3. Show current DS0 status with the following command:

   `status ds0` *<n:ch>*

   Example: status ds0 13:1-16

4. If drop DS1 and DS0 status indications are correct, skip remaining steps.

5. If drop DS1 and DS0 status indications are not correct, verify and repeat setting procedures. If that does not produce correct status indications, follow standard practices to resolve network problems

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Test Remote Circuits

NOTE: The Access Navigator can be pre-provisioned so that it will be ready to provide services when facilities become available. Therefore, it may be necessary to skip over the circuit testing steps in this procedure.

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

1. Follow standard practices to test subscriber drop DS1 circuits.
2. Follow standard practices to test DS0 connections, analog channels, and remote interfaces.

NOTE: Access Bank II Indicators – The following table shows analog card channel status indications for loop start and ground start subscriber connections. The default DIP switch settings provide automatic loop start and ground start translation for each channel. Other DIP switch settings provide various E&M signaling options, which apply to the entire card.

Call Status	FX and SPOTS Loop Start (SPR)	FX and SPOTS Ground Start (UVG)	E&M to Loop or Ground Start
Idle	Green	Off	Off
Incoming Seizure	Green	Green	Green
Ringing	Green	Green	Green
Outgoing Seizure	Yellow	Red	Red
Completed Call	Yellow	Yellow	Yellow
Unsupported signaling option selected	Red Flashing	Red Flashing	Red Flashing

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CHAPTER 12

Provision Remote Adit 600 via FDL

In this Chapter

- Remote Adit 600 FDL Provisioning Overview ... 12-2
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- Verify Equipment Configuration ... 12-6
- Provision Drop DS1s to Remote Adit 600 ... 12-10
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- Provision Remote Adit 600 ... 12-17
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Remote Adit 600 FDL Provisioning Overview

This procedure covers remote management and provisioning of Carrier Access' Adit® 600 TDM Customer Service Terminals. The Adit 600 TDM provides six service card slots that support up to 18 T1s (DS1s) per unit, up to 48 voice channels, or any combination of voice and data services.

The Access Navigator / GR-303 + Data Host and GR-303 Host with P-Phone can both serve as a host for remote Adit 600 terminals, providing GR-303 voice concentration and data grooming. In addition to providing the user with remote management of the Adit 600, the Access Navigator requires a management link to the Adit 600 to process ISDN BRI calls through the Adit 600.

There are two management configurations:

- FDL Management – sends CLI commands over the DS1's ESF Facility Data Link (FDL)
- IP DS0 Management – sends IP management commands over a DS0 channel in the DS1. This IP DS0 management configuration is required to support P-Phone service using an Access Navigator / GR-303 Host with P-Phone. See *Provision Remote Adit 600 via IP DS0* on page 13-1.

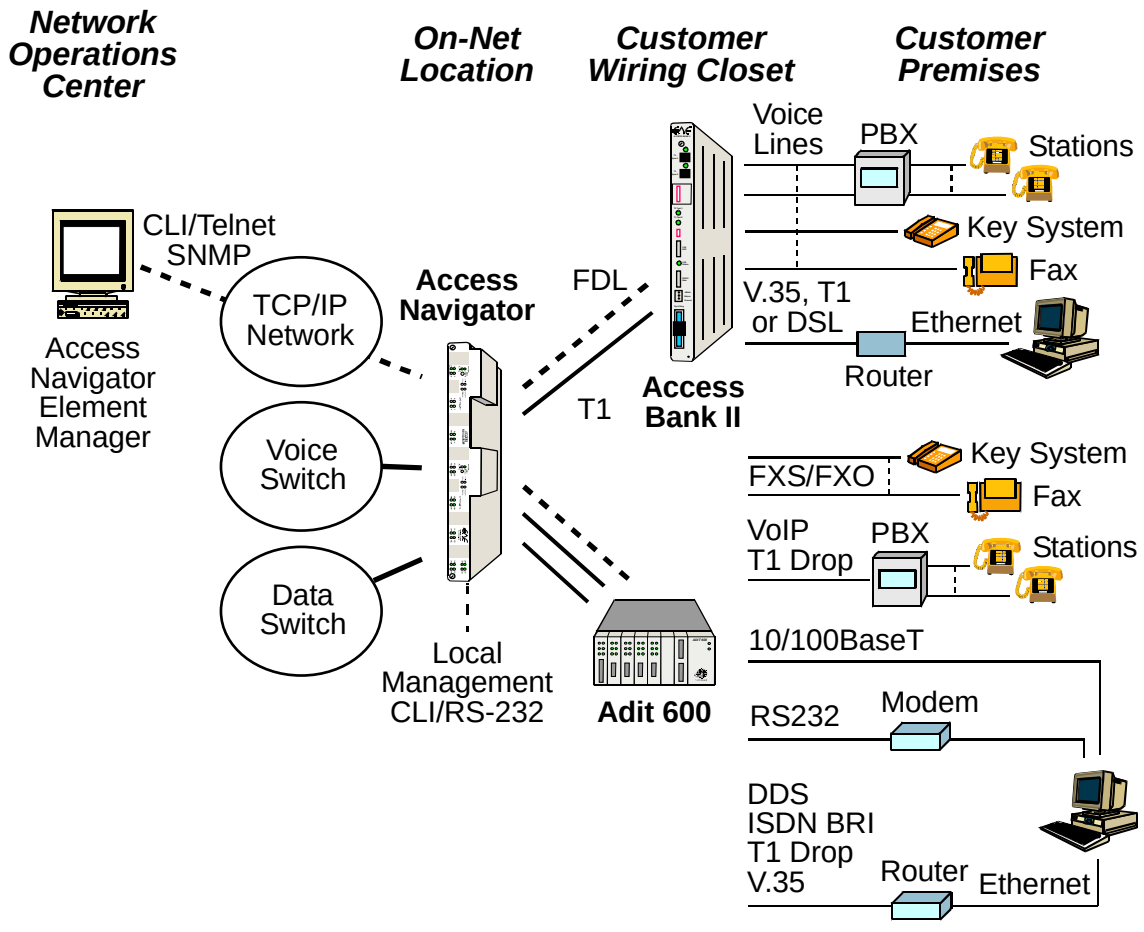

Figure 12-1 Adit 600 Voice and Data Services with FDL Management

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After configuring the FDL management connection, the user can remotely provision the Adit 600 by logging onto the Access Navigator, starting a remote management session, and sending Adit 600 CLI commands over the FDL channel.

FDL Management Configuration

NOTE: T1 Type 1 facilities are recommended for reliable remote management. Type 2 facilities – in which the T1 is transported across other carrier networks – may not be reliable because the FDL channel can be used or disabled by the other carriers.

FDL management requires T1 facilities with ESF framing to carry management and provisioning commands over the DS1's Facility Data Link. The Access Navigator must have software version 1.5 or higher and the DS1 link between the Access Navigator and the remote Adit 600 terminal must be provisioned for Carrier Access FDL management. Only one FDL management link should be made to the Controller card of each remote Adit 600.

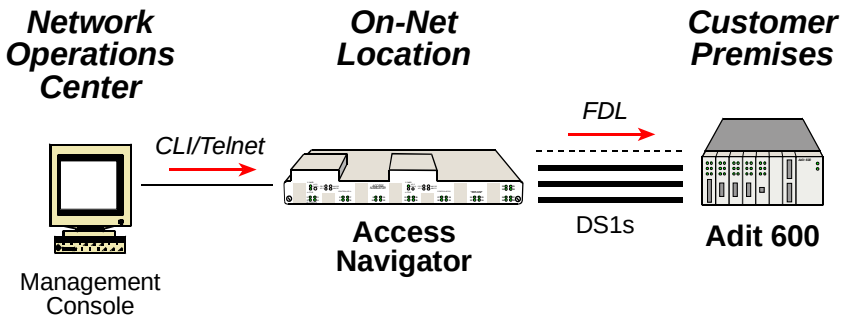

Figure 12-2 Carrier Access FDL Management Configuration

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Remote Adit 600 FDL Provisioning Quick Guide

CLI Commands	Descriptions
status equipment	Verify equipment configuration.
show ds1 <*n*>|**all**> **status ds1** <*n*> **status ds0** <*n:ch*>	Verify service status.
set ds1 <*n*> **down** **set ds0** <*n:ch*> **down** **set ds0** <*n:ch*> **type** <**voice**|**data**>	Set unused circuits out of service (down). If the DS1 is not terminated, set the DS0 type of all channels to data. If the DS1 is terminated, set the DS0 type of any unused channels to match the DS0 type (voice or data) configured on the device at the other end of the DS1.
set ds1 <*n*> **type drop**	DS1 type for remote Adit 600.
set ds1 <*n*> **framing** <**d4**|**esf**>	DS1 framing. Use ESF for FDL.
set ds1 <*n*> **linecode** <**ami**|**b8zs**>	DS1 line code. Use B8ZS for FDL.
set ds1 <*n*> **id** <*"id"*>	DS1 identifier.
set ds1 <*n*> **clock** <**normal**|**loop**>	DS1 clock source.
set ds1 <*n*> **fdl none**	DS1 FDL type for remote Adit.
set ds1 <*n*> **remote device mgmt cafdl**	Set drop DS1 to remote Adit on to use Carrier Access FDL protocol.
set ds1 <*n*> **remote device mgmt ds1** <*n*>	Set all other drop DS1s to same remote Adit to point to DS1 using CAFDL.
set ds1 <*n*> **lbo** <*setting*>	DS1 line buildout.
set ds1 <*n*> **loopdetect** <**on**|**off**>	Usually off for drop DS1s.
show connect <*n*>	Verify DS0 crossconnections.
disconnect <*n:ch*>	Remove old DS0 connections (if any).
set ds0 <*n:ch*> **type** <**voice**|**data**|**gr303**>	DS0 type.
set ds0 <*n:ch*> **signal** <**ls**|**gs**|**em**>	DS0 signaling (voice or GR-303 types only).
connect <*n:ch*> <*n:ch*>	Add DS0 crossconnections.

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CLI Commands	Descriptions
set ds0 *<n:ch>* **up**	Set DS0s in service.
set ds1 *<n>* **up**	Set DS1s in service.

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Obtain Provisioning Information

1. Obtain office records for installation site.
2. Obtain circuit orders for remote Adit 600 service turn up.

Verify Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch. Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to data.

NOTE: For remote FDL provisioning, the Adit 600 must be set to ESF framing, B8ZS line code, and ANSI T1.403 FDL protocol. (These are the default settings.)

1. Start management session (see *Start Management Session* on page 7-1).
2. Verify number of DS1 circuits installed by comparing equipment status with office records with the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment         Status               Version
---------         ------               -------
Controller A      Standby              01.70 GR-303 Option
Controller B      Active               01.70 GR-303 Option
DS1 Card 1        Installed               1
DS1 Card 2        Installed               1
DS1 Card 3        Installed               1
DS1 Card 4        Installed               1
DS1 Card 5        Installed               1
DS1 Card 6        Installed               1
DS1 Card 7        Installed               1
DS1 Card 8        Installed               1
```

3. Verify number of DS1 circuits installed by comparing equipment status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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4. Show current DS1 service status with the following command:

   `show ds1 all`

   A message similar to the following will appear, showing the link up/down service status of all DS1s in the Access Navigator, as well as certain other parameters of common interest in provisioning and trouble-shooting.

Circuit ID	Link	Type	Line Code	Framing	Term ID	FDL	Remote Device Mgmt
CA DS1# 01	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 02	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 03	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 04	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 05	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 06	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 07	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 08	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 09	UP	DROP	B8ZS	ESF		None	CA FDL
CA DS1# 10	UP	DROP	B8ZS	ESF		None	CA IP
CA DS1# 11	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 12	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 13	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 14	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 15	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 16	UP	DROP	AMI	D4		None	None
CA DS1# 17	UP	DROP	AMI	D4		None	None
CA DS1# 18	UP	DROP	B8ZS	SLC96		None	SLC96
CA DS1# 19	UP	DROP	B8ZS	SLC96		None	None
CA DS1# 20	UP	DROP	B8ZS	ESF		T1403	None
CA DS1# 21	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 22	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 23	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 24	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 25	DOWN	SWITCH	B8ZS	ESF	1	None	None
CA DS1# 26	DOWN	SWITCH	B8ZS	ESF	3	None	None
CA DS1# 27	DOWN	SWITCH	B8ZS	ESF	4	None	None
CA DS1# 28	DOWN	SWITCH	B8ZS	ESF	5	None	None
CA DS1# 29	DOWN	SWITCH	B8ZS	ESF	2	None	None
CA DS1# 30	DOWN	SWITCH	B8ZS	ESF	6	None	None
CA DS1# 31	DOWN	SWITCH	B8ZS	ESF	7	None	None
CA DS1# 32	UP	GROOM	B8ZS	ESF		None	None

5. Verify number of DS1s already in service (Link is UP) by comparing DS1 link status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing `ds1 <n>` require the operator to enter a DS1 number or range of numbers. For example, DS1 #6 is entered as `ds1 6`. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing `ds1 1-8`.

6. Show current DS1 status with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status ds1` <*n*>

   Example: status ds1 1

   This command will produce a message listing the status of the specified DS1 or range of DS1s. For example, the message for DS1 #9 and #32 might look similar to the following. Note that the message for DS1 #9 shows the DS1 is in service, while the message for DS1 #32 indicates there is no Quad Framer circuit card installed.

```
Status for DS1 9:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   None
    Remote Device Mgmt Type:    CA FDL

Status for DS1 32:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      Card Not Installed
    FDL Type:                   None
    Remote Device Mgmt Type:    None
```

7. Verify status of DS1 lines to be turned up by comparing DS1 status with office records. If there is a discrepancy, follow standard practices to resolve problem.
8. Verify current status of any remote devices with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status remote` <*n*|**`all`**>

   Example: status remote 1

   This command will produce a message listing the remote terminals at the far end of the DS1s.

```
DS1  Terminal              ID                      Status
---  --------------------  ----------------------  --------------
  1  CA Adit 600           Remote Device #1        In Service as CA FDL
```


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NOTE: Commands containing `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

9. Display current DS0 status with the following command, where `<n:ch>` is the DS0 or range of DS0s in the DS1 to be turned up:

   `status ds0` *`<n:ch>`*

   Example: status ds0 10:1-4

   The status command will display the status for each DS0 specified. For example, the message for DS1 #10, DS0 channels 1 to 4, and DS1 #32, DS0 channels 1 to 4, would look similar to the following:

```
Interface                Status
---------                ------
DS1 10 Channel 1         In Service
DS1 10 Channel 2         In Service
DS1 10 Channel 3         In Service
DS1 10 Channel 4         In Service

DS1 32 Channel 1         Card Not Installed
DS1 32 Channel 2         Card Not Installed
DS1 32 Channel 3         Card Not Installed
DS1 32 Channel 4         Card Not Installed
```

10. Verify status of DS0 circuits on DS1 lines to be turned up by comparing DS0 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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Provision Drop DS1s to Remote Adit 600

1. Show drop DS1 settings with the following command:

   `show ds1` *<n>*

   Example: show ds1 10

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 1 might look similar to the following:

```
Settings for DS1  1:
    Circuit ID:              CA DS1# 01
    Up/Down:                 UP
    Framing:                 ESF
    Line Coding:             B8ZS
    Type:                    DROP
    Clock Source:            NORMAL
    Line Build Out:          DSX-1 EQUALIZATION FOR 0-133 ft.
    Loop Code Detection:     OFF
    Loop Back:               OFF
    Line Termination ID:     0  (for switch DS1s only)
    Remote Device MGMT:      CA FDL
    FDL Type:                None
    Send Code:               OFF
    Performance Thresholds:     15 min.      1 hour       1 day
                               --------     --------     --------
    unavailable seconds:              0            0            0
    severely errored seconds:         0            0            0
    errored seconds:                  0            0            0
    sev. errored frame seconds:       0            0            0
    degraded minutes:                 0            0            0
    linecode violations:              0            0            0
```

NOTE: Access Navigator Release 1.7 provides new remote management commands. For Carrier Access FDL management, the Remote Device Management type must be set to CA FDL and the DS1 FDL type must be set to None.

2. If drop DS1 settings are correct, skip remaining steps.

3. Set DS1 out of service with the following command:

   `set ds1` *<n>* **`down`**

   Example: set ds1 1 down

   Example: set ds1 10-15 down

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4. Set DS1 type to "drop"

   set ds1 <*n*> **type drop**

   Example: set ds1 1 type drop

5. Set DS1 framing to ESF or D4 (SF). Use ESF for FDL management.

   set ds1 <*n*> **framing esf**

   Example: set ds1 1 framing esf

6. Set DS1 line code

   set ds1 <*n*> **linecode** <*ami|b8zs*>

   Example: set ds1 1 linecode esf

7. Set drop DS1 clock source to normal or loop

   set ds1 <*n*> **clock** <*normal|loop*>

   Example: set ds1 10 clock normal

8. Set DS1 FDL type to none.

   set ds1 <*n*> **fdl none**

   Example: set ds1 1 fdl none

9. Set DS1 remote device management type to use CAFDL for Carrier Access FDL management.

   set ds1 <*n*> **remote device management cafdl**

   Example: set ds1 1 remote device management cafdl

10. Set all other drop DS1s to same remote Adit to point to DS1 using CAFDL.

    set ds1 <*n*> **remote device mgmt ds1** <*n*>

    Example: set ds1 1 remote device management cafdl

11. Set drop DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation

    set ds1 <*n*> **lbo** <*setting*>

    Example: set ds1 1 lbo 1

    The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop code detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Loop detection is normally turned off for DS1 drops.

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12. Set drop DS1 loop request code detection off with the following command:

    `set ds1 <n> loopdetect off`

    Example: set ds1 1 loopdetect off

13. Set DS1 identification

    `set ds1 <n> id <"name">`

    Example: set ds1 10 id "DS1#10"

14. Set DS1 in service

    `set ds1 <n> up`

    Example: set ds1 1 up

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Provision Drop DS0s

NOTE: Commands such as `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

1. Show current DS0 settings with the following command:

   `show ds0` *<n:ch>*

   Example: show ds0 13:1-4

   The show command will produce a status message for each DS1 specified. For example, the message for DS1 number 13, DS0 channels 1 to 4 would look similar to the following:

```
Settings for DS1 13, Channel 1:
    Type:            VOICE
    Signaling:       LOOP START (FXS)
    Up/Down:         UP
    CRV:             113
    ISDN:            none

Settings for DS1 13, Channel 2:
    Type:            VOICE
    Signaling:       LOOP START (FXS)
    Up/Down:         UP
    CRV:             114 (assigned but not available)
    ISDN:            none

Settings for DS1 13, Channel 3:
    Type:            DATA
    Signaling:       NONE
    Up/Down:         UP
    CRV:             115
    ISDN:            B1

Settings for DS1 13, Channel 4:
    Type:            DATA
    Signaling:       NONE
    Up/Down:         UP
    CRV:             115 (assigned but not available)
    ISDN:            none
```

2. If drop DS0 settings are correct, skip remaining steps.

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3. Set DS0 type

   `set ds0` <*n:ch*> **`type`** <*voice|data|gr303*>

   Example: set ds0 10:1-18 type gr303

   Example: set ds0 10:19-24 type data

4. Set DS0 signaling (for voice only) to Loop Start (ls), Ground Start (gs), or E&M (em) signaling with the following command:

   `set ds0` <*n:ch*> **`signal`** <*ls|gs|em*>

   Example: set ds0 10:1-18 signal ls

5. Set DS0 call reference value (GR-303 or ISDN BRI only)

   `set ds0` <*n:ch*> **`crv`** <*setting*>

   Example: set ds0 10:1 crv 120

6. Set DS0 in service

   `set ds0` <*n:ch*> **`up`**

   Example: set ds0 10:1-24 up

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Provision DS0 Crossconnects (if required)

NOTE: Static DCS voice and data crossconnects, as well as ISDN BRI D (signaling) channels, must be provisioned in the Access Navigator. Crossconnects are not required for GR-303 voice and ISDN BRI B (bearer) channels because they are dynamically assigned by the switch.

1. Show current crossconnect settings with the following command:

   `show connect` *<n>*

   Example: show connect 10

   The show command will display the current settings for the specified DS1. For example, the message for DS1 number 11 would look similar to the following:

```
Connections for DS1 #10 (CA DS1# 10):

From    To    Type   Interface [--> Port]
----   -----  -----  --------------------
10:01  .....  GR303
10:02  .....  GR303
10:03  .....  GR303
10:04  .....  GR303
10:05  .....  GR303
10:06  .....  GR303
10:07  .....  GR303
10:08  .....  GR303
10:09  .....  GR303
10:10  .....  GR303
10:11  .....  GR303
10:12  .....  GR303
10:13  .....
10:14  .....
10:15  .....
10:16  .....
10:17  17:12  DATA   AcmeInternet --> V.35
10:18  17:13  DATA   AcmeInternet --> V.35
10:19  17:14  DATA   AcmeInternet --> V.35
10:20  17:15  DATA   AcmeInternet --> V.35
10:21  17:16  DATA   AcmeInternet --> V.35
10:22  17:17  DATA   AcmeInternet --> V.35
10:23  17:18  DATA   AcmeInternet --> V.35
10:24  17:19  DATA   AcmeInternet --> V.35
```

2. If DS0 crossconnect settings are correct, skip remaining steps.

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NOTE: To change existing DS0 connections, you must first disconnect them before making new connections.

3. Disconnect existing DS0s with the following command:

   `disconnect` *<n:ch>*

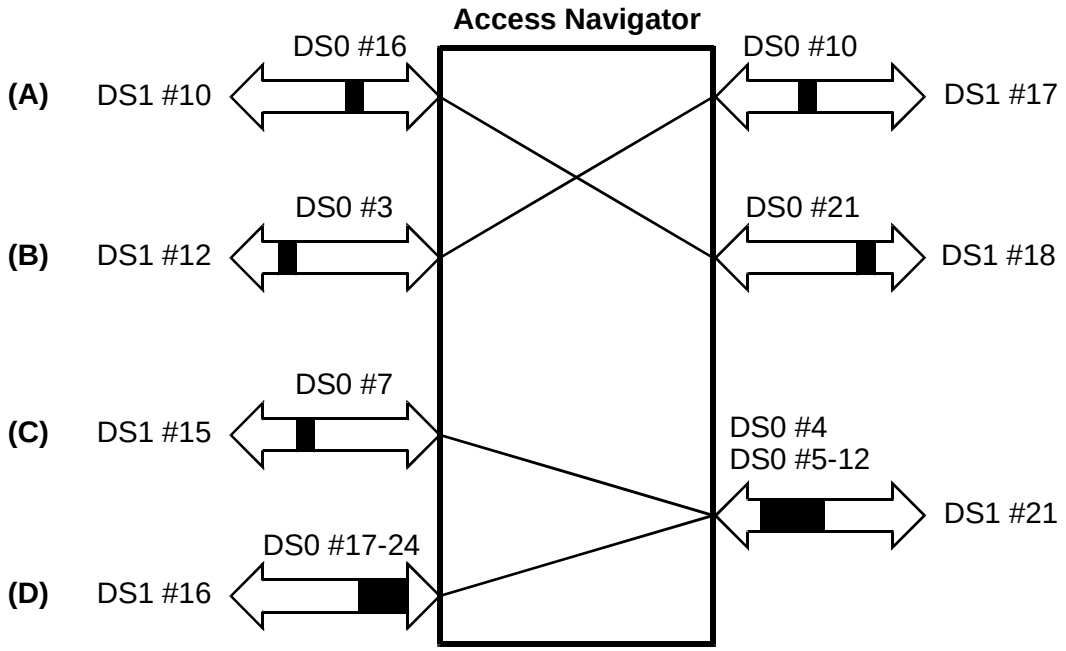
   Example: disconnect 10:16-24

4. Connect DS0s (see Figure 1) to make 2-way connections between DS0s, or fractional groups of DS0s, with the following command:

   `connect` *<n:ch> <n:ch>*

   Example: connect 10:16 18:21

   Example: connect 16:17-24 21:5-12



Command Examples: (A) connect ds0 10:16 18:21
(B) connect ds0 12:3 17:10
(C) connect ds0 15:7 21:4
(D) connect ds0 16:17-24 21:5-12

Figure 12-3. Crossconnect Examples

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Provision Remote Adit 600

1. Start remote management session with Adit 600 terminal, where <n> is the number of the Access Navigator drop DS1 going to the terminal.

   `logon remote` <*n*>

   Example: logon remote 10

2. When Adit 600 prompt appears, provision terminal using Adit 600 CLI commands (refer to *Adit 600 User Manual*.
3. When finished provisioning Adit 600 terminal, enter **`Ctrl+C`** to cancel the connection to the remote terminal. The Access Navigator prompt will then appear.
4. Exit management session when finished.

   `exit`

Test DS1 and DS0 Circuits

NOTE: The Access Navigator can be pre-provisioned so that it will be ready to provide services when facilities become available. Therefore, it may be necessary to skip over the circuit testing steps in this procedure.

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

1. Follow standard practices to test subscriber drop DS1 circuits.
2. Follow standard practices to test DS0 connections, analog channels, and remote interfaces.

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CHAPTER 13

Provision Remote Adit 600 via IP DS0

In this Chapter

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- Obtain Provisioning Information ... 13-8
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- Provision Groom DS1s to Adit Router ... 13-12
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- Provision Remote Adit 600 ... 13-23
- Test DS1 and DS0 Circuits ... 13-23

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Remote IP DS0 Provisioning Overview

This procedure covers remote management and provisioning of Carrier Access' Adit® 600 TDM Customer Service Terminals. The Adit 600 TDM provides six service card slots that support up to 18 T1s (DS1s) per unit, up to 48 voice channels, or any combination of voice and data services.

The Access Navigator / GR-303 + Data Host and GR-303 Host with P-Phone can both serve as a host for remote Adit 600 terminals, providing GR-303 voice concentration and data grooming.

There are two management configurations:

- IP DS0 Management – sends IP management commands over a DS0 channel in the drop DS1.
- FDL Management – sends CLI commands over the DS1's ESF Facility Data Link (FDL). This FDL management configuration does not support P-Phone service from the remote Adit 600. See *Provision Remote Adit 600 via FDL* on page 12-1.

After configuring the IP DS0 management connection, the user can remotely provision the Adit 600 by sending NetworkValet™ EMS IP commands or Adit CLI/Telnet commands over the IP DS0 management channel.

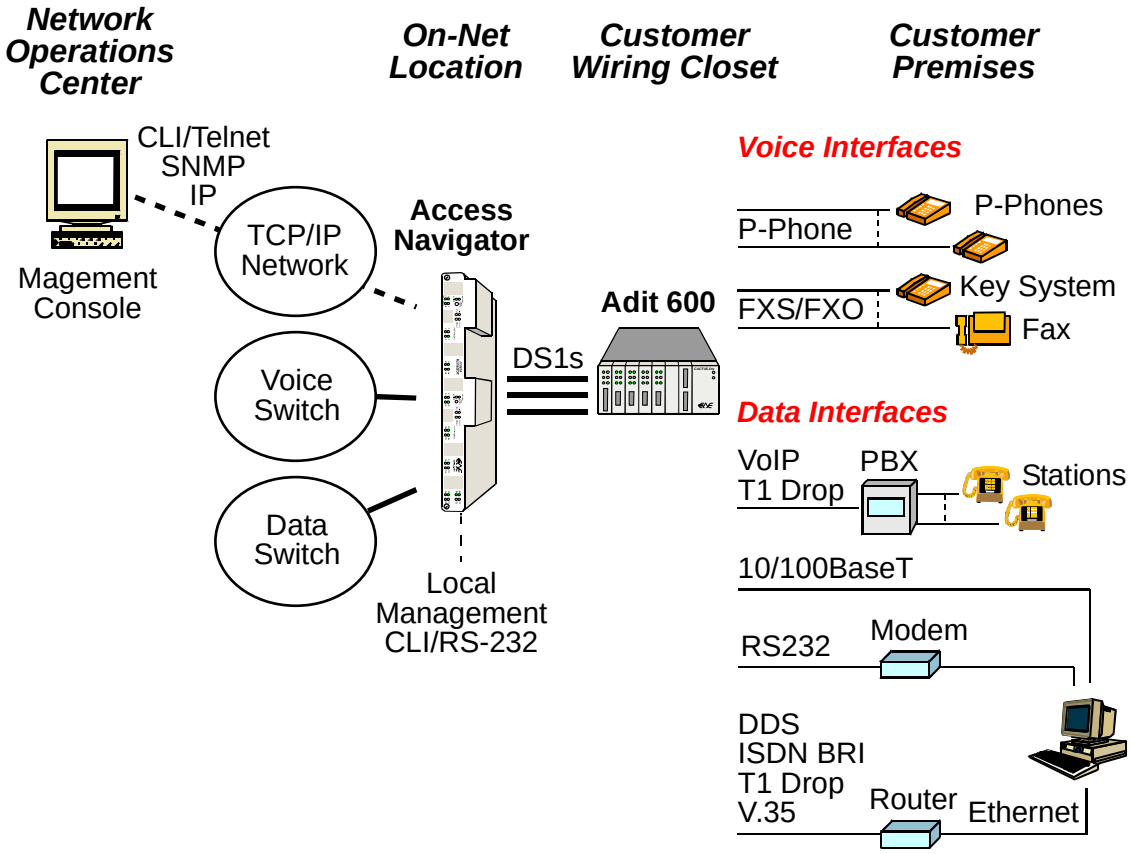

Figure 13-1 Adit 600 Voice and Data Services with IPD S0 Management

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IP DS0 Management Configuration

IP DS0 management can be used with T1 Type 2 facilities lacking FDL capability. This scheme uses an external colocated Ethernet/T1 router, such as an Adit 600 with Adit Router card installed. The router sends IP management and provisioning commands over a DS0 management channel to the remote Adit 600. This enables both the Network Operations Center and the Access Navigator to communicate with the remote Adit 600. The management DS0 also carries control messages for ISDN BRI and P-Phone applications.

The Access Navigator crossconnects the management DS0 in the groom DS1 to a drop DS1 going to the remote Adit 600. The IP DS0 management channel must be carried by a DS1 connected to one of the two T1 ports on the remote Adit 600 Controller card. The following figure shows a typical IP addressing scheme for managing several remote Adits.

NOTE: To provision IP DS0 management, it is necessary to configure the Access Navigator, remote Adit 600, and colocated Adit Router. This manual includes Quick Guides for all three products. For detailed information, refer to the *Adit 600 User Manual* and *Adit Router User Manual*.

NOTE: P-Phone support requires the following minimum software versions:
Access Navigator: release 1.8 or higher
Adit 600 Controller (colocated) : release 5.0 or higher
Adit 600 Controller (remote) :release 6.0 or higher
IP Router card: release 1.5 or higher
Terminal Server Router (TSR) card: release 1.0 or higher
Customer Media Gateway (CMG) Router card: release 1.1 or higher

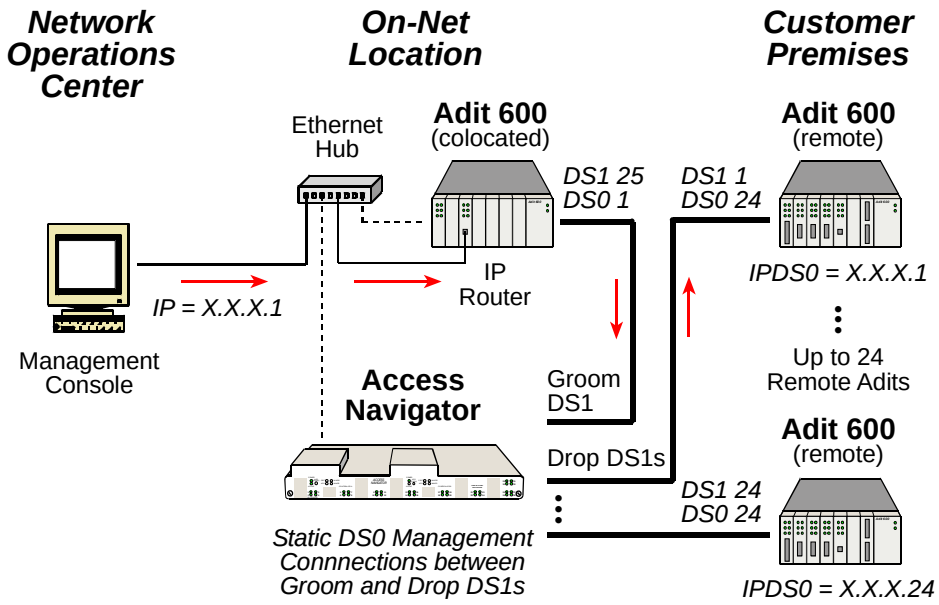

Figure 13-2 Carrier Access IP DS0 Management Configuration

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Remote IP DS0 Provisioning Quick Guide

Access Navigator CLI Commands	Descriptions
status equipment	Verify equipment configuration.
show ds1 <*n*>|**all**> **status ds1** <*n*> **status ds0** <*n:ch*>	Verify service status.
set ds1 <*n*> **down** **set ds0** <*n:ch*> **down** **set ds0** <*n:ch*> **type** <**voice**|**data**>	Set unused circuits out of service (down). If the DS1 is not terminated, set the DS0 type of all channels to data. If the DS1 is terminated, set the DS0 type of any unused channels to match the DS0 type (voice or data) configured on the device at the other end of the DS1.
set ethernet <*ipaddress*>	Set Ethernet IP address.
set ip gateway <*ipaddress*>	Set gateway to router's IP address.
set ds1 <*n*> **type groom** **set ds1** <*n*> **type drop**	DS1 type for router. DS1 type for remote Adit.
set ds1 <*n*> **framing** <**d4**|**esf**>	DS1 framing is ESF for remote Adit.
set ds1 <*n*> **linecode** <**ami**|**b8zs**>	DS1 line code (b8zs is default).
set ds1 <*n*> **fdl** <**none**|**slc96**|**t1403**>	DS1 fdl is none for remote Adit.
set ds1 <*n*> **remote device mgmt caip**	Set DS1 remote device management to use IP address of remote Adit.
set ds1 <*n*> **remote device mgmt caip** <*ipaddress*> [**pphone**]	Set DS1 remote device management to use IP address of remote Adit and enable P-Phone service.
set ds1 <*n*> **remote device mgmt ds1** <*n*>	Set all other drop DS1s to same remote Adit to point to DS1 above.
set ds1 <*n*> **id** <*"id"*>	DS1 identifier.
set ds1 <*n*> **clock** <**normal**|**loop**>	DS1 clock source.
set ds1 <*n*> **lbo** <*setting*>	DS1 line buildout.
set ds1 <*n*> **loopdetect** <**on**|**off**>	Usually off for drop DS1s.
show connect <*n*>	Verify DS0 crossconnections.
disconnect <*n:ch*>	Remove old DS0 connections (if any).
set ds0 <*n:ch*> **type data** **set ds0** <*n:ch*> **type** <**voice**|**data**|**gr303**>	DS0 type for management channel DS0 types for other channels.
set ds0 <*n:ch*> **signal** <**ls**|**gs**|**em**>	DS0 signaling (voice or GR-303 types only).
connect <*n:ch*> <*n:ch*>	Crossconnect management DS0.

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Access Navigator CLI Commands	Descriptions
`set ds0` *<n:ch>* **`up`**	Set DS0s in service.
`set ds1` *<n>* **`up`**	Set DS1s in service.
`status remote` *<n>*	Verify status of management channel.

Router Provisioning Quick Guide

NOTE: The following commands assume that the Router card is in slot 1.

NOTE: The remote Adit WAN address MUST have a different subnet than the Adit Controller address.

Adit CLI Commands	Descriptions
`set local off`	Sets Adit to be configured through CLI.
`set a:2 down`	Sets T1-2 out of service.
`disconnect a`	Disconnects all connections to slot a (controller).
`set a:1:24 type data`	Sets all DS0s on T1-1 to data signalling type.
`connect a:1:1 1:1:1` **`connect a:1:2 1:1:2`** **`connect a:1:24 1:1:24`**	Connects DS0s on controller T1-1 to DS0s of port 1, WAN 1 to 24, of Router in slot 1. Repeat for all 24 channels.

Router Setup
Telnet into Router by specifying {slot}:{port}. Example: **`telnet 1:1`**
Enter password (default is "admin") and press Enter key.
Note: Once you are in the Router, the Tab key will move you through the menus and the Spacebar will scroll you through selections in <>.
Select Terminal Emulation (scroll with Tab key) and press Enter key.

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Router Setup (Continued)
Configure Trunk Connections: 1. Select **Configuration** < **Profile Directory** > from Router Main Menu and press Enter key. 2. Select **Router** < **Profile Setup** > and press Enter key. 3. Select **Trunk** < **Configure** -> and press Enter key. 4. For all WAN port numbers already assigned a DS0 for management, select < **Frame Relay 1490** > as the WAN connections Type 5. Select the **PVC Management** as < **Disabled** >. 6. Press Escape key to Exit and <**Yes**> to save changes. This will return you to the **Trunk Configure** window. For these configuration changes to take effect, you must Reinitialize the Router as described later.
Configure the Local Adit Profile: 1. Select **LocalAdit LAN** <**Setup** -> and press Enter key. 2. Set the following on this screen: Select the **IP Protocol Eth II** (with an X), all others should not be selected. Set the **LAN Networks Updates** for **IP** and **IPX** to < **Neither** >. Set the **LAN IP Address** to the required Router IP Address along with the **Subnet Mask.** 3. Press Escape key to Exit and <**Yes**> to save changes.
Create a Remote Adit Profile for all Remotes: 1. Select **RemoteAdit WAN** <**Setup** -> and press Enter key. 2. Set the following on this screen: Rename **RemoteAdit** (default name) to **Adit1.** Set **WAN Networks Updates** for **IP** to < **Never** >. Set **WAN IP: Numbered** to <**No**>. 3. Tab to **Setup**: <**Static/VPN Networks**> (scroll to this selection if it is not displayed). 4. Set **Setup Static**: to <**IP Networks**> (scroll to this selection if it is not displayed). 5. Press Ctrl A to add a Static IP Address. 6. Set **Device Name** to **Adit1.** Set the **IP Address** to the Adit1 WAN address. 7. Press Escape key to exit and <**Yes**> to save changes. 8. Select **Setup**: <**Trunk Port**> and press Enter key. 9. Select the following on this screen: At the **Select WAN Port Number**: <**None**>, scroll **None** to **1** (which is the remote Adit1). Set **DLCI** to **16.** 10. Press Escape key to exit the **Trunk Port** configuration window. 11. Press Escape key to exit and <**Yes**> to save changes.
Reinitialize the Router: 1. Select **Exit** <**Reinitialize**> from the **Router** main window and press Enter key. 2. Select <**YES**> and press Enter key to reinitialize the Router Card. This will save all the changes recent made to the router.

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Remote Adit IP DS0 Provisioning Quick Guide

NOTE: The following commands assume that the remote Adit is set to the factory defaults.

Adit CLI Commands	Descriptions
set local off	Sets Adit to be configured through CLI.
set a:2 down	Sets T1-2 out of service.
disconnect a	Disconnects all connections to slot a (controller).
set a:1:24 type data	Sets all DS0s on T1-1 to data signalling type.
set ipds0 assign a:1:24	Assigns DS0 24 as the IP management channel.
set ipds0 ip address *<address> <mask>*	Sets the DS0 management channel IP address (Adit WAN address).
set ipds0 up	Set DS0 management channel in service.
show connect a:1	Displays connections to T1-1 of the controller.
show ipds0	Displays configuration of the DS0 management channel.
status ipds0	Displays status (up/down) of the DS0 management channel.

Test the DS0 management channel as follows:

1. PING Adit1 IP address from the Adit Router.
2. PING Adit1 IP address from the Access Navigator.
3. PING Adit1 IP address from the management PC.
4. Telnet to Adit1 IP address from the PC to the remote Adit.

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Obtain Provisioning Information

1. Obtain office records for installation site.
2. Obtain circuit orders for remote Adit 600 service turn up.

Verify Equipment Configuration

CAUTION! **VERIFY CURRENT CONFIGURATION AND SERVICE STATUS WITH OFFICE RECORDS BEFORE ADDING, DELETING, OR CHANGING CIRCUITS.**

NOTE: The factory default sets all DS1s and DS0s in-service (up). To prevent inadvertent service disruptions, it is good practice to set circuits out of service (down) when not in use or not provisioned in the switch. Set the type of unused DS0 channels to match the DS0 type configured on the device at the other end of the DS1. If the DS1 is not terminated, set the type to data.

1. Start management session (see *Start Management Session* on page 7-1).
2. Verify number of DS1 circuits installed by comparing equipment status with office records with the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status       Version
---------        ------       -------
Controller A     Active       01.70 GR-303 Option
Controller B     Standby      01.70 GR-303 Option
DS1 Card 1       Installed     1
DS1 Card 2       Installed     1
DS1 Card 3       Installed     1
DS1 Card 4       Installed     1
DS1 Card 5       Installed     1
DS1 Card 6       Installed     1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

3. Verify number of DS1 circuits installed by comparing equipment status with office records. If there is a discrepancy, follow standard practices to resolve problem.
4. Show current DS1 service status with the following command:

   `show ds1 all`

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A message similar to the following will appear, showing the link up/down service status of all DS1s in the Access Navigator, as well as certain other parameters of common interest in provisioning and trouble-shooting.

Circuit ID	Link	Type	Line Code	Framing	Term ID	FDL	Remote Device Mgmt
CA DS1# 01	DOWN	DROP	B8ZS	ESF		None	CA IP
CA DS1# 02	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 03	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 04	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 05	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 06	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 07	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 08	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 09	UP	DROP	B8ZS	ESF		None	CA FDL
CA DS1# 10	UP	DROP	B8ZS	ESF		None	CA IP
CA DS1# 11	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 12	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 13	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 14	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 15	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 16	UP	DROP	AMI	D4		None	None
CA DS1# 17	UP	DROP	AMI	D4		None	None
CA DS1# 18	UP	DROP	B8ZS	SLC96		None	SLC96
CA DS1# 19	UP	DROP	B8ZS	SLC96		None	None
CA DS1# 20	UP	DROP	B8ZS	ESF		T1403	None
CA DS1# 21	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 22	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 23	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 24	DOWN	DROP	B8ZS	ESF		None	None
CA DS1# 25	DOWN	SWITCH	B8ZS	ESF	1	None	None
CA DS1# 26	DOWN	SWITCH	B8ZS	ESF	3	None	None
CA DS1# 27	DOWN	SWITCH	B8ZS	ESF	4	None	None
CA DS1# 28	DOWN	SWITCH	B8ZS	ESF	5	None	None
CA DS1# 29	DOWN	SWITCH	B8ZS	ESF	2	None	None
CA DS1# 30	DOWN	SWITCH	B8ZS	ESF	6	None	None
CA DS1# 31	DOWN	SWITCH	B8ZS	ESF	7	None	None
CA DS1# 32	UP	GROOM	B8ZS	ESF		None	None

NOTE: Access Navigator Release 1.7 provides new remote management commands. For Carrier Access IP DS0 management, the Remote Device Management type must be set to CA IP and the DS1 FDL type must be set to None.

5. Verify number of DS1s already in service (link is up) by comparing DS1 link status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing `ds1 <n>` require the operator to enter a DS1 number or range of numbers. For example, DS1 #6 is entered as `ds1 6`. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing `ds1 1-8`.

6. Show current DS1 status with the following command, where <*n*> is the DS1 or range of DS1s to be turned up:

   `status ds1` <*n*>

   Example: status ds1 10

   This command will produce a message listing the status of the specified DS1 or range of DS1s. For example, the message for DS1 #10 and #11 might look similar to the following. Note that the message for DS1 #10 shows the DS1 is in service, while the message for DS1 #11 indicates there is no Quad Framer circuit card installed.

```
Status for DS1 10:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  In Service
    FDL Type:               None

Status for DS1 11:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  Card Not Installed
    FDL Type:               None
```

7. Verify status of DS1 lines to be turned up by comparing DS1 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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NOTE: Commands containing `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

8. Display current DS0 status with the following command, where `<n:ch>` is the DS0 or range of DS0s in the DS1 to be turned up:

   `status ds0` *`<n:ch>`*

   Example: status ds0 10:1-4

   The status command will display the status for each DS0 specified. For example, the message for DS1 #10, DS0 channels 1 to 4, and DS1 #32, DS0 channels 1 to 4, would look similar to the following:

```
Interface              Status
---------              ------
DS1 10 Channel 1       In Service
DS1 10 Channel 2       In Service
DS1 10 Channel 3       In Service
DS1 10 Channel 4       Out of Service

DS1 32 Channel 1       Card Not Installed
DS1 32 Channel 2       Card Not Installed
DS1 32 Channel 3       Card Not Installed
DS1 32 Channel 4       Card Not Installed
```

9. Verify status of DS0 circuits on DS1 lines to be turned up by comparing DS0 status with office records. If there is a discrepancy, follow standard practices to resolve problem.

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Provision Groom DS1s to Adit Router

NOTE: For IP DS0 management, it is recommended that DS1 #32 be connected to the colocated router.

1. Show groom DS1 settings with the following command:

   `show ds1` *<n>*

   Example: show ds1 32

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 1 might look similar to the following:

```
Settings for DS1  32:
    Circuit ID:              CA DS1# 32
    Up/Down:                 UP
    Framing:                 ESF
    Line Coding:             B8ZS
    Type:                    GROOM
    Clock Source:            NORMAL
    Line Build Out:          DSX-1 EQUALIZATION FOR 0-133 ft.
    Loop Code Detection:     OFF
    Loop Back:               OFF
    Line Termination ID:     0  (for switch DS1s only)
    Remote Device MGMT:      None
    FDL Type:                None
    Send Code:               OFF
    Performance Thresholds:     15 min.      1 hour       1 day
                               --------    --------    --------
    unavailable seconds:              0           0           0
    severely errored seconds:         0           0           0
    errored seconds:                  0           0           0
    sev. errored frame seconds:       0           0           0
    degraded minutes:                 0           0           0
    linecode violations:              0           0           0
```

NOTE: In the above message, Loop Back is a test function that is turned off during normal service. Line Termination IDs are used only for GR-303 switch DS1s. FDL Status does not appear if FDL Type is none.
P-Phone settings only appear in the Access Navigator / GR-303 Host with P-Phone option, when the Remote Management type is CA IP with P-Phone enabled and the remote device is an Adit 600. (If P-Phone isn't enabled, the setting will list it as disabled.)

2. If groom DS1 settings are correct, skip remaining steps.

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3. Set DS1 out of service with the following command:

   `set ds1 <n> down`

   Example: set ds1 32 down

4. Set DS1 type to "groom"

   `set ds1 <n> type groom`

   Example: set ds1 32 type groom

5. Set DS1 framing to ESF (default) for Carrier Access IP DS0 management.

   `set ds1 <n> framing esf`

   Example: set ds1 32 framing esf

6. Set DS1 line code to B8ZS (default) for Carrier Access IP DS0 management

   `set ds1 <n> linecode b8zs`

   Example: set ds1 32 linecode b8zs

7. Set drop DS1 clock source to normal (default) for Carrier Access IP DS0 management

   `set ds1 <n> clock normal`

   Example: set ds1 32 clock normal

8. Set drop DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation. Setting 1 is typical for a coloated Adit Router.

   `set ds1 <n> lbo <setting>`

   Example: set ds1 32 lbo 1

   The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attenuation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

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NOTE: When loop code detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Loop detection is normally turned off for DS1 drops.

9. Set drop DS1 loop request code detection off with the following command:

   `set ds1 <n> loopdetect off`

   Example: set ds1 32 loopdetect off

10. Set DS1 identification

    `set ds1 <n> id <"name">`

    Example: set ds1 32 id "DS1#32"

11. Set DS1 in service

    `set ds1 <n> up`

    Example: set ds1 32 up

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Provision Drop DS1s to Remote Adit

1. Show drop DS1 settings with the following command:

   show ds1 <*n*>

   Example: show ds1 10

   The show command will produce a message showing the DS1 settings. For example, the message for DS1 number 1 might look similar to the following:

```
Settings for DS1  32:
    Circuit ID:              CA DS1# 32
    Up/Down:                 UP
    Framing:                 ESF
    Line Coding:             B8ZS
    Type:                    DROP
    Clock Source:            NORMAL
    Line Build Out:          DSX-1 EQUALIZATION FOR 0-133 ft.
    Loop Code Detection:     OFF
    Loop Back:               OFF
    Line Termination ID:     0  (for switch DS1s only)
    Remote Device MGMT:      CA IP CA 192.168.201.1
    PPHONE Call Connection:  Enabled
    FDL Type:                None
    Send Code:               OFF
    Performance Thresholds:         15 min.      1 hour       1 day
                                   --------     --------     --------
    unavailable seconds:                 0            0            0
    severely errored seconds:            0            0            0
    errored seconds:                     0            0            0
    sev. errored frame seconds:          0            0            0
    degraded minutes:                    0            0            0
    linecode violations:                 0            0            0
```

2. If drop DS1 settings are correct, skip remaining steps.

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3. Set DS1 out of service with the following command:

   `set ds1` <*n*> **`down`**

   Example: set ds1 1 down

   Example: set ds1 10-15 down

4. Set DS1 type to "drop"

   `set ds1` <*n*> **`type drop`**

   Example: set ds1 1 type drop

5. Set DS1 framing to ESF or D4 (SF). Use ESF for Carrier Access FDL management or D4 for IP DS0 management.

   `set ds1` <*n*> **`framing`** <*d4|esf*>

   Example: set ds1 1 framing esf

6. Set DS1 line code

   `set ds1` <*n*> **`linecode`** <*ami|b8zs*>

   Example: set ds1 1 linecode esf

7. Set drop DS1 clock source to normal or loop

   `set ds1` <*n*> **`clock`** <*normal|loop*>

   Example: set ds1 10 clock normal

8. Set DS1 remote device management type to use Carrier Access IP management (CAIP) using the IP address of the remote device being managed.

   `set ds1` <*n*> **`remote device management caip`** <*ipaddr*> [**`pphone`**]

   Example: set ds1 1 remote device management caip 192.168.3.158

   Include pphone option to enable P-Phone service to the remote Adit 600. Do not use this option unless P-Phone service is required.

9. Set all other drop DS1s to same remote Adit to point to DS1 using CAIP.

   `set ds1` <*n*> **`remote device mgmt ds1`** <*n*>

   Example: set ds1 2 remote device management ds1 1

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10. Set drop DS1 line buildout (lbo) to required DSX-1 equalization or CSU attenuation

    `set ds1` *<n>* **`lbo`** *<setting>*

    Example: set ds1 1 lbo 1

    The setting is a number from 1 to 9, and is defined as follows:

Setting	Definition
1	Set DSX-1 equalization for 0-133 ft.
2	Set DSX-1 equalization for 133-266 ft.
3	Set DSX-1 equalization for 266-399 ft.
4	Set DSX-1 equalization for 399-533 ft.
5	Set DSX-1 equalization for 533-666 ft.
6	Set CSU attenuation for LBO of 0dB.
7	Set CSU attentation for LBO of -7.5dB.
8	Set CSU attenuation for LBO of -15dB.
9	Set CSU attenuation for LBO of -22.5dB.

NOTE: When loop code detection is turned on, the Access Navigator will respond to T1.403 ESF bit patterned loop requests. Loop detection is normally turned off for DS1 drops.

11. Set drop DS1 loop request code detection off with the following command:

    `set ds1` *<n>* **`loopdetect off`**

    Example: set ds1 1 loopdetect off

12. Set DS1 identification

    `set ds1` *<n>* **`id`** *<"name">*

    Example: set ds1 25 id "DS1#10"

13. Set DS1 in service

    `set ds1` *<n>* **`up`**

    Example: set ds1 1 up

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Provision Groom DS0s to Adit Router

NOTE: Commands such as `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

1. Show current DS0 settings with the following command:

   `show ds0` *<n:ch>*

   Example: show ds0 32:1-4

   The show command will produce a status message for each DS0 specified. For example, the message for DS1 number 32, DS0 channel 10 would look similar to the following:

```
Settings for DS1 32, Channel 10:
    Type:             DATA
    Signaling:        NONE
    Up/Down:          UP
    CRV:              320 (assigned but not available)
    ISDN:             none
```

2. If groom DS0 settings are correct, skip remaining steps.

3. Set DS0 type to data for IP DS0 management

   `set ds0` *<n:ch>* **`type data`**

   Example: set ds0 32:6 type data

   Example: set ds0 32:1-24 type data

4. Set DS0 in service

   `set ds0` *<n:ch>* **`up`**

   Example: set ds0 10:1-24 up

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Provision Drop DS0s to Remote Adit

NOTE: Commands such as `ds0 <n:ch>` require the operator to enter both the DS1 and DS0 channel number or channel range. The DS1 and DS0 numbers are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as `ds0 6:1-12`. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

NOTE: When connected to a Nortel DMS switch, each Access Navigator can support up to 384 P-Phone channels from up to 14 Adit 600 terminals.

1. Show current DS0 settings with the following command:

   `show ds0` *<n:ch>*

   Example: show ds0 13:1-4

   The show command will produce a status message for each DS1 specified. For example, the message for DS1 number 13, DS0 channels 1 to 4 would look similar to the following:

```
Settings for DS1 13, Channel 1:
     Type:              GR303
     Signaling:         LOOP START
     Up/Down:           UP
     CRV:               35
     PPHONE:            Enabled
     ISDN:              None

Settings for DS1 13, Channel 2:
     Type:              GR303
     Signaling:         DID
     Up/Down:           UP
     PPHONE:            Enabled
     CRV:               36
     ISDN:              None

Settings for DS1 13, Channel 3:
     Type:              DATA
     Up/Down:           DOWN
     CRV:               No CRV assigned
     PPHONE:            Enabled
     ISDN:              None

Settings for DS1 13, Channel 4:
     Type:              GR303
     Up/Down:           UP
     CRV:               38
     PPHONE:            Enabled
     ISDN:              None
```


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NOTE: In the above message, the channel type can be GR303 (voice or ISDN BRI), or private crossconnects using VOICE or DATA. P-Phone settings only appear in the Access Navigator / GR-303 Host with P-Phone. This procedure only provides steps for provisioning GR-303 service. See also *Provision DCS Service* on page 9-1.

2. If drop DS0 settings are correct, skip remaining steps.
3. Set DS0 type. (ISDN BRI and P-Phone use gr303.)

   `set ds0` *<n:ch>* **`type`** *<voice|data|gr303>*

   Example: set ds0 10:1-18 type gr303

   Example: set ds0 10:19-24 type data
4. Set DS0 signaling (for voice only) to Loop Start (ls), Ground Start (gs), or E&M (em) signaling with the following command:

   `set ds0` *<n:ch>* **`signal`** *<ls|gs|em>*

   Example: set ds0 10:1-18 signal ls
5. Set DS0 call reference value (needed for GR-303 ISDN BRI and P-Phone)

   `set ds0` *<n:ch>* **`crv`** *<setting>*

   Example: set ds0 10:1 crv 120
6. Set DS0 in service

   `set ds0` *<n:ch>* **`up`**

   Example: set ds0 10:1-24 up

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Provision DS0 Crossconnects

NOTE: Static DCS voice and data crossconnects, as well as ISDN BRI D (signaling) channels, must be provisioned in the Access Navigator. Crossconnects are not required for GR-303 voice and ISDN BRI B (bearer) channels because they are dynamically assigned by the switch.

1. Show current crossconnect settings with the following command:

   `show connect` *<n>*

   Example: show connect 10

   The show command will display the current settings for the specified DS1. For example, the message for DS1 number 11 would look similar to the following:

```
Connections for DS1 #10 (CA DS1# 10):

From    To    Type   Interface [--> Port]
----   -----  -----  --------------------
10:01  .....  GR303
10:02  .....  GR303
10:03  .....  GR303
10:04  .....  GR303
10:05  .....  GR303
10:06  .....  GR303
10:07  .....  GR303
10:08  .....  GR303
10:09  .....  GR303
10:10  .....  GR303
10:11  .....  GR303
10:12  .....  GR303
10:13  .....
10:14  .....
10:15  .....
10:16  .....
10:17  17:12  DATA   AcmeInternet --> V.35
10:18  17:13  DATA   AcmeInternet --> V.35
10:19  17:14  DATA   AcmeInternet --> V.35
10:20  17:15  DATA   AcmeInternet --> V.35
10:21  17:16  DATA   AcmeInternet --> V.35
10:22  17:17  DATA   AcmeInternet --> V.35
10:23  17:18  DATA   AcmeInternet --> V.35
10:24  32:10  DATA
```

NOTE: For IP DS0 management, it is recommended that the management channel be assigned to DS0 #24 on the drop DS1 to the remote Adit 600.

2. If DS0 crossconnect settings are correct, skip remaining steps.

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NOTE: To change existing DS0 connections, you must first disconnect them before making new connections.

3. Disconnect existing DS0s with the following command:

   `disconnect` *<n:ch>*

   Example: disconnect 10:16-24

4. Connect the IP DS0 management channel on the Adit 600 drop DS1 to the IP DS0 management channel on the Adit Router groom DS1, with the following command.

   `connect` *<n:ch> <n:ch>*

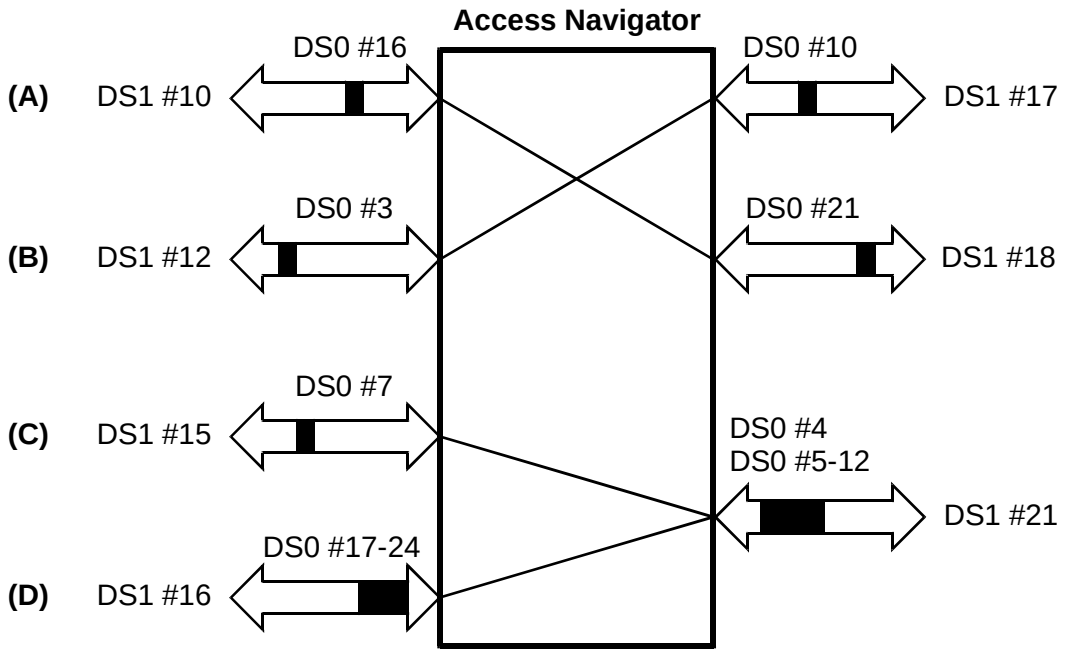
   Example: connect 10:24 25:10

5. Connect other DS0s (see Figure 13-3) to make 2-way connections between DS0s, or fractional groups of DS0s, with the following command:

   `connect` *<n:ch> <n:ch>*

   Example: connect 10:16 18:21

   Example: connect 16:17-24 21:5-12



Command Examples: (A) connect ds0 10:16 18:21
(B) connect ds0 12:3 17:10
(C) connect ds0 15:7 21:4
(D) connect ds0 16:17-24 21:5-12

Figure 13-3. Crossconnect Examples

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Provision Remote Adit 600

NOTE: Remote provisioning requires that the Adit 600 be pre-configured for IP DS0 management. The essential settings are listed in the *Remote Adit IP DS0 Provisioning Quick Guide* on page 13-7.

After configuring the Adit 600 for IP DS0 management, the remote terminal can be accessed through the Access Navigator as described in the following steps.

Carrier Access IP DS0 management also allows remote provisioning via Telnet and Carrier Access Valet™ and NetworkValet™ EMS software by using the IP address of the remote Adit 600.

1. Start remote management session with Adit 600 terminal, where <n> is the number of the Access Navigator drop DS1 going to the terminal.

   `logon remote` <*n*>

   Example: logon remote 10

2. When Adit 600 prompt appears, provision terminal using Adit 600 CLI commands (refer to *Adit 600 User Manual*.
3. When finished provisioning Adit 600 terminal, enter **`Ctrl+C`** to cancel the connection to the remote terminal. The Access Navigator prompt will then appear.
4. Exit management session when finished.

   `exit`

Test DS1 and DS0 Circuits

NOTE: The Adit 600 also supports remote testing of its network and subscriber interfaces. See *Adit 600 TDM User Manual*.

NOTE: The Access Navigator supports the following T1.403 loop tests:
- Responds to ESF bit patterned loop requests (when loopdetect is on)
- Generates ESF bit patterned loop requests
- Generates SF CSU inband loopcodes

NOTE: The Access Navigator provides line and payload loopback commands for troubleshooting line problems. See *Diagnostics & Troubleshooting* on page 15-1.

1. Follow standard practices to test subscriber drop DS1 circuits.
2. Follow standard practices to test DS0 connections, analog channels, and remote interfaces.

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CHAPTER 14

Alarm Clearing

In this Chapter

- Identify Alarm Clearing Procedure ... 14-2
- Clear Alarms – FDL ... 14-3
- Clear Alarms – EOC ... 14-8
- Clear Alarms – SNMP ... 14-14
- Clear Alarms – Status Indicators ... 14-15

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Identify Alarm Clearing Procedure

Find alarm source in following list and go to the alarm clearing procedure:

- **CLI** alarm message – go to *Clear Alarms – FDL* on page 14-3
- **EOC** alarm message – go to *Clear Alarms – EOC* on page 14-8
- **SNMP** alarm message – go to *Clear Alarms – SNMP* on page 14-14
- **Equipment Status Indicators** – go to *Clear Alarms – Status Indicators* on page 14-15
- **Facility Alarm System** – go to *Clear Alarms – FDL* on page 14-3
- **Unknown** – go to *Clear Alarms – FDL* on page 14-3

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Clear Alarms – FDL

NOTE: The CLI has three alarm levels:
CRITICAL alarms affect service to 128 or more subscribers.
(Only the manually set critical alarm is currently defined.)
MAJOR alarms affect service to 24 or more subscribers.
MINOR alarms are non-service affecting, but reduce reliability.

1. Start RS-232 or Telnet management session (see *Start Management Session* on page 7-1).
2. Display all currently active alarms with the following command:

   `alarms`

This will produce an alarm status message similar to the following, showing all currently active alarms:

```
Time     Date       Severity   Description
----     ----       --------   -------------------------
03:11:17 01/09/1999 Major DS1 20 Loss Of Signal
00:00:17 01/09/1999 Major DS1 19 Loss Of Signal
00:00:17 01/14/1999 Minor Onboard Power Supply B Failure
```

3. Operate Alarm Cutoff (ACO) if desired with the following command.

   `aco`
4. If there any Critical alarms, follow trouble clearing procedure in Table 14-1 on page 14-3 to clear alarms and then return to Step 2.
5. If there any Major alarms, follow trouble clearing procedure in Table 14-2 on page 14-4 to clear alarms and then return to Step 2.
6. If there any Minor alarms, follow trouble clearing procedure in Table 14-3 on page 14-5 to clear alarms and then return to Step 2.
7. Continue to monitor alarms for next 30 minutes to ensure that no alarms are reported.
8. If more alarms have been reported, go to Step 2.
9. Return faulty units to repair facility.

Table 14-1 CLI Critical Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
Manually set critical alarm	Allows user to set and clear critical alarm state. LED, relay, alarm, and event logs follow setting.	Use following command to clear alarm: **set alarms critical off**

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Table 14-2 CLI Major Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
DS1 Card *n* Removed While In Service	Quad T1 Framer card removed while one or more of the 4 DS1s were provisioned as in-service.	Insert a Quad T1 Framer card, or provision all 4 DS1s as out of service. Use following command to change service state: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Loss of Frame	DS1 has LOF (Loss of Frame) – there is a signal present but the DS1 receiver is not framed to it. This alarm occurs if the DS1 is set for ESF and the incoming signal is D4 (or vice-versa).	Correct the problem with the incoming DS1 signal, or use following command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Loss of Signal	DS1 has LOS (Loss of Signal)	Correct the problem with the incoming DS1 signal, or use following command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* RAI (Yellow Alarm)	DS1 is receiving RAI (Remote Alarm Indication), also known as Yellow Alarm. The far end network element sends this alarm when it declares Carrier Failure Alarm (LOS, LOF, AIS).	Correct the problem with the incoming DS1 at the far end, or use following command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Transmit Failure	Quad T1 Framer transmit DS1 circuit failure	Replace the Quad T1 Framer card, or use following command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
Manually set major alarm	Allows user to set and clear critical alarm state. LED, relay, alarm, and event logs follow setting.	Use following command to clear alarm: set alarms major off

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Table 14-3 CLI Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
-48V DC power *A/B* Low or Missing	-48V DC power supply to the controller (A or B) is low or missing. Under normal condition power is shared between controller cards.	Check power cable connection or battery voltage of the reporting controller card.
Alarm Input *1/2/3* Detected	Contact closure was detected on the indicated alarm input (1,2, or 3). Alarm inputs can be wired to the facility alarm system. Under normal conditions the facility alarm system should provide open contacts to the alarm inputs. Providing contact closure to an alarm input results in this alarm.	The alarm is cleared when the contact is opened.
Controller *A/B* Incompatible	Controllers do not support the same functionality; for example, one supports EOC/TMC and the other does not.	Remove the standby controller and replace with a compatible controller (see *Replace Controller Card* on page 16-3 or update controller with compatible software (see *Update Controller Card Software* on page 17-1).
Controller *A/B* Removed	Upon removal the controller card (A or B), the remaining controller card is now *active*.	Insert a good controller card into the empty slot
Controller A/B software version mismatch	Controller card software versions do not match.	Update offending controller with appropriate software (see *Update Controller Card Software* on page 17-1).
DS1 *n* Major Line CV	DS1 is receiving Line Code Violations at a rate greater than 1.0 x 10-3. This indicates a weak signal or faulty wiring.	Correct the problem with the incoming DS1 signal, or use following command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>

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Table 14-3 CLI Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
EOC *Primary/Secondary* Link Down	EOC LAPD data link communication not established with the switch. Access Navigator periodically retries to establish LAPD data link with the switch. Ensure DS1 assigned to EOC is healthy. Note: This alarm will also occur if TMC or EOC is set to none.	Check status of DS1 assigned for EOC with the following command: **`status eoc`** Check EOC provisioning with the following command: **`show eoc`** Use following command to change setting: **set eoc** <*primary*/*secondary*> **ds1** <n>
Manually set minor alarm	Allows user to set and clear critical alarm state. LED, relay, alarm, and event logs follow setting.	Use following command to clear alarm: set alarms minor off
On Board Power Supply *A/B* Failure	DC power supply on the controller (A or B) caused a failure.	Reporting controller card (A or B) must be replaced.
Remote Device #*n:* T1 #*x* Loss of Carrier	Remote device on DS1 #*n* reported loss of carrier on T1 #*x*.	Clear trouble at remote device.
Remote Device #*n:* T1 #*x* Loss of Synch	Remote device on DS1 #*n* reported loss of synchronization on T1 #*x*.	Clear trouble at remote device.
Remote Device #*n:* T1 #*x* rx AIS	Remote device on DS1 #*n* received Blue alarm (AIS) on T1 #*x*.	Clear trouble at remote device.
Remote Device #*n:* T1 #*x* rx Yellow alarm	Remote device on DS1 #*n* received Yellow alarm (RAI) on T1 #*x*.	Clear trouble at remote device.
Remote Device #*n*: V.35 loss of RTS	Remote device on DS1 #*n* reported loss of RTS on V.35 interface.	Clear trouble at remote device.

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Table 14-3 CLI Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
TMC *Primary/ Secondary* Link Down	TMC LAPD data link communication not established with the switch. Access Navigator periodically retries to establish LAPD data link with the switch. Ensure DS1 assigned to TMC is healthy. Note: This alarm will also occur if TMC or EOC is set to none.	Check status of DS1 assigned for TMC with the following command: **`status tmc`** Check TMC provisioning with the following command: **`show tmc`** Use following command to change setting: **set tmc** <*primary*/*secondary*> **ds1** <n>

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Clear Alarms – EOC

NOTE: EOC Interface – This procedure describes Access Navigator alarm messages sent to the local switch over the GR-303 Embedded Operations Channel (EOC). Because some EOC messages are reported only to the local switch, it is recommended that this procedure be followed to identify EOC alarms. If Command Line Interface (CLI) commands are needed to clear the alarm, the operator should go to *Clear Alarms – FDL* on page 14-3.

NOTE: Alarms – The EOC has four alarm levels:
CRITICAL alarms affect service to 128 or more subscribers.
(No critical alarms are currently defined. The Access Navigator does not report manually set alarms (used for maintenance testing) over the EOC.)
MAJOR alarms affect service to 24 or more subscribers.
MINOR alarms are non-service affecting, but reduce reliability.
WARNING alarms are non-service affecting, but reduce reliability.
(Warnings are reported only to the local switch, not to the CLI.)

1. Retrieve EOC alarms from the local switch.
2. If there any Critical alarms, follow trouble clearing procedure in Table 14-4 on page 14-8 to clear alarms and then return to Step 1.
3. If there any Major alarms, follow trouble clearing procedure in Table 14-5 on page 14-9 to clear alarms and then return to Step 1.
4. If there any Minor alarms, follow trouble clearing procedure in Table 14-6 on page 14-10 to clear alarms and then return to Step 1.
5. If there any Warning alarms, follow trouble clearing procedure in Table 14-7 on page 14-13 to clear alarms and then return to Step 1.
6. Continue to monitor alarms for next 30 minutes to ensure that no alarms are reported.
7. If any more alarms have been reported, go to Step 2
8. Return faulty units to repair facility.

Table 14-4. EOC Critical Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
	No critical alarms have been defined.	

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Table 14-5. EOC Major Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
Alarm Count List Change	Event Report Service Problem. (Reported only if the alarm count list has been created. The alarm count list is created by DMS switches.) The number of alarms active in the Access Navigator has changed. Only those alarms reportable to the switch and excluding Service Problems are included in the alarm count list.	The alarm is cleared after all events reportable to the switch have been cleared.
DS1 Card *n* Removed While In Service	Event Report Line Card Problem. Quad T1 Framer card removed while one or more of the four DS1s were provisioned as in-service.	Insert a Quad T1 Framer card, or provision all four DS1s as out of service. Use following CLI command to change service state: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Loss of Frame	Event Report LOF Problem. DS1 has LOF (Loss of Frame) – there is a signal present but the DS1 receiver is not framed to it. This alarm occurs if the DS1 is set for ESF and the incoming signal is D4 (or vice-versa).	Correct the problem with the incoming DS1 signal, or use following CLI command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Loss of Signal	Event Report LOS Problem. DS1 has LOS (Loss of Signal)	Correct the problem with the incoming DS1 signal, or use following CLI command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* RAI (Yellow Alarm)	Event Report Alarm Indication. DS1 is receiving RAI (Remote Alarm Indication), also known as Yellow Alarm. The far end network element sends this alarm when it declares Carrier Failure Alarm (LOS, LOF, AIS).	Correct the problem with the incoming DS1 at the far end, or use following CLI command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>
DS1 *n* Transmit Failure	Event Report Framing Problem. Quad T1 Framer transmit DS1 circuit failure.	Replace the Quad T1 Framer card, or use following CLI command to provision the DS1 as out of service: **set ds1** <*n*> <*up*|*down*>

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Table 14-5. EOC Major Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
System Alarm State Change	Event Report Service Problem (5ESS only). The severity of the system alarm state has changed. Only those events reportable to the switch and excluding Service Problems are included in the system alarm state.	The alarm is cleared after all events reportable to the switch have been cleared.

Table 14-6 EOC Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
-48V DC power *A/B* Low or Missing	Event Report Power Problem. -48V DC power supply to the controller (A or B) is low or missing. Under normal condition power is shared between controller cards.	Check power cable connection or battery voltage of the reporting controller card.
Alarm Count List Change	Event Report Service Problem. (Reported only if the alarm count list has been created. The alarm count list is created by DMS switches.) The number of alarms active in the Access Navigator has changed. Only those alarms reportable to the switch and excluding Service Problems are included in the alarm count list.	The alarm is cleared after all events reportable to the switch have been cleared
Alarm Input *1/2/3* Detected	Event Report Environmental Problem. Contact closure was detected on the indicated alarm input (1,2, or 3). Alarm inputs can be wired to the facility alarm system. Under normal conditions the facility alarm system should provide open contacts to the alarm inputs. Providing contact closure to an alarm input results in this alarm.	The alarm is cleared when the contact is opened.

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Table 14-6 EOC Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
Controller *A/B* Incompatible	Event Report Replaceable Unit Mismatch. Controllers do not support the same functionality; for example, one supports EOC/TMC and the other does not.	Remove the standby controller and replace with a compatible controller (see *Replace Controller Card* on page 16-3) or update controller with compatible software (see *Update Controller Card Software* on page 17-1).
Controller *A/B* Removed	Event Report Replaceable Unit Missing. Upon removal the controller card (A or B), the remaining controller card is now *active*.	Insert a good controller card into the empty slot
Controller A/B software version mismatch	Event Report Replaceable Unit Mismatch. Controller card software versions do not match.	Update offending controller with appropriate software (see *Update Controller Card Software* on page 17-1).
DS1 *n* Major Line CV	DS1 is receiving Line Code Violations at a rate greater than 1.0 x 10-3. This indicates a weak signal or faulty wiring.	Correct the problem with the incoming DS1 signal, or provision the DS1 as out of service
EOC *Primary/Secondary* Link Down	Event Report Service Problem. EOC LAPD data link communication not established with the switch. Access Navigator periodically retries to establish LAPD data link with the switch. Ensure DS1 assigned to EOC is healthy.	Check status of DS1 assigned for EOC with the following CLI command: **`status eoc`** Check EOC provisioning with the following CLI command: **`show eoc`** Use following CLI command to change setting: **set eoc** <*primary*/*secondary*> **ds1** <n>
Remote Device #*n:* T1 #*x* Loss of Synch	Remote device on DS1 #*n* reported loss of synchronization on T1 #*x*. Minor alarm for active crossconnects.	Clear trouble at remote device.
Remote Device #*n:* T1 #*x* rx AIS	Remote device on DS1 #*n* received Blue alarm (AIS) on T1 #*x*. Minor alarm for active crossconnects.	Clear trouble at remote device.

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Table 14-6 EOC Minor Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
Remote Device #*n:* T1 #*x* rx Yellow alarm	Remote device on DS1 #*n* received Yellow alarm (RAI) on T1 #*x*. Minor alarm for active crossconnects.	Clear trouble at remote device.
Remote Device #*n*: V.35 loss of RTS	Remote device on DS1 #*n* reported loss of RTS on V.35 interface. Minor alarm for active crossconnects.	Clear trouble at remote device.
TMC *Primary/ Secondary* Link Down	Event Report Service Problem. TMC LAPD data link communication not established with the switch. Access Navigator periodically retries to establish LAPD data link with the switch. Ensure DS1 assigned to TMC is healthy.	Check status of DS1 assigned for TMC with the following CLI command: **`status tmc`** Check TMC provisioning with the following CLI command: **`show tmc`** Use following CLI command to change setting: **set tmc** <*primary*/*secondary*> **ds1** <n>
System Alarm State Change	Event Report Service Problem (5ESS only). The severity of the system alarm state has changed. Only those events reportable to the switch and excluding Service Problems are included in the system alarm state.	The alarm is cleared after all events reportable to the switch have been cleared.

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Table 14-7 EOC Warning Alarm Message and Trouble Clearing Procedure

Event Message	Description	Trouble Clearing Procedure
Alarm Count List Change	Event Report Service Problem. (Reported only if the alarm count list has been created. The alarm count list is created by DMS switches.) The number of alarms active in the Access Navigator has changed. Only those alarms reportable to the switch and excluding Service Problems are included in the alarm count list.	The alarm is cleared after all events reportable to the switch have been cleared.
Analog Line Termination Out of Service	Event Report Service Problem. A previously in-service DS0 configured as an analog line termination has been disabled (**`set ds0`** <*n:ch*> **`down`**) or an error condition has been detected and the DS1 is now out of service.	Correct the problem with the incoming DS1 signal, or provision the DS1 as out of service.
DS1 Out of Service	Event Report Service Problem (Reported only if DS1 type = SWITCH). A previously in-service DS1 has been disabled (**`set ds1`** <*n*> **`down`**) or an error condition has been detected and the DS1 is now out of service.	Correct the problem with the incoming DS1 signal, or provision the DS1 as out of service.
System Alarm State Change	Event Report Service Problem (5ESS only). The severity of the system alarm state has changed. Only those events reportable to the switch and excluding Service Problems are included in the system alarm state.	The alarm is cleared after all events reportable to the switch have been cleared.

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Clear Alarms – SNMP

NOTE: This procedure describes Access Navigator trap messages sent to a Network Management System (NMS) IP address. If Command Line Interface (CLI) commands are needed to clear the alarm, the operator should go to *Clear Alarms – FDL* on page 14-3.

1. Retrieve trap messages from the network management system.
2. If there are any trap messages, follow trouble clearing procedure in Table 14-8 to clear alarms and then return to Step 1.

Table 14-8 Trap Message and Trouble Clearing Procedure

Trap Message	Description	Trouble Clearing Procedure
authenticationFailure	Occurs when a bad community string is used.	None required. However, repeated occurrences may indicate an incorrect management program setting or an attempt to breach security.
linkDown	Sent when a DS1 changes from an up (in service) state to a down (out of service) state. It is not sent when a DS1 is set "down" by a CLI command.	Message includes DS1 number (1 to 32). To clear the DS1 alarm, see *Clear Alarms – FDL* on page 14-3.
linkUp	Sent when a DS1 changes from a down (out of service) state to an up (in service) state. It is not sent when a DS1 is set "up" by a CLI command.	None required.
warmStart	Sent whenever the SNMP agent is restarted as a result of a software reset or unit power-up.	None required. However, if not caused by operator, then repeated occurrences may indicate a facility power problem.

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Clear Alarms – Status Indicators

Find indicator in following list and go to the alarm clearing procedure:

- **POWER** indicator – go to *Power Status LEDs* on page 14-16
- **ACTIVE** indicator – go to *Active/Standby Controller Status LEDs* on page 14-17
- **CRITICAL** indicator – go to *Critical Alarm Status LEDs* on page 14-18
- **MAJOR** indicator – go to *Major Alarm Status LEDs* on page 14-18
- **MINOR** indicator – go to *Minor Alarm Status LEDs* on page 14-19
- **ACO** indicator – go to *Alarm Cutoff (ACO) Status LED* on page 14-19
- **DSI** indicator – go to *DS1 Status LEDs* on page 14-20
- **Ethernet** indicator (on rear panel) – go to *Ethernet Link Status LED* on page 14-21

NOTE: Alarm and equipment status can also be determined using CLI commands. See *Clear Alarms – FDL* on page 14-3.

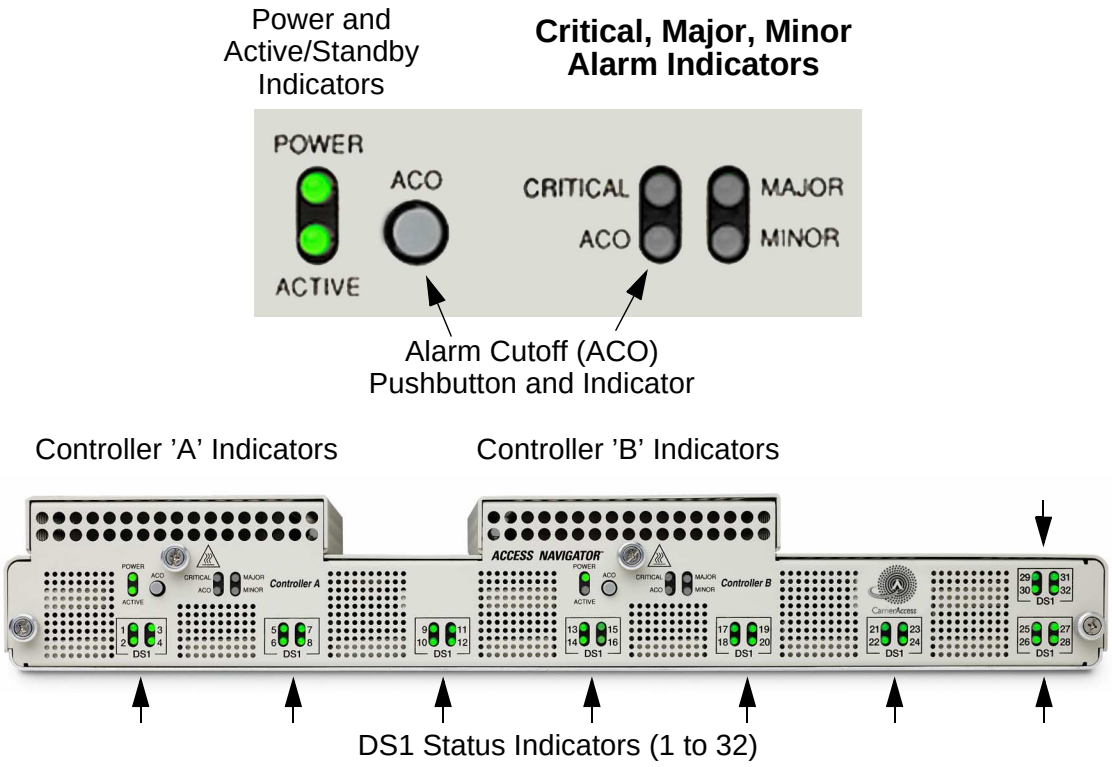

Figure 14-1. Front Panel Indicators (Ethernet Indicator is on Rear Panel)

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Power Status LEDs

The Access Navigator may have one or two Controller cards. Each Controller card has a Power LED indicator showing the status of the -48 VDC input power as well as the status of the card's internal power supply.

Table 14-9. Power Status LEDs

LED State	Description	Troubleshooting
Green	Normal operation	Normal operation.
Off	-48V power failure or power missing	Check -48V input to unit. Input voltage must be between -42 and -60 V.
Red	Internal power supply failure	Power supply is located on Controller card. Replace suspect Controller card (A or B) with known good card. Cards can be replaced with power on.
Yellow	Card is booting up after reset or power-on.	If a software upgrade to version 1.20 or higher is performed on a standby Controller without a SIMM installed, the Controller's POWER indicator will remain yellow until the required SIMM is installed

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Active/Standby Controller Status LEDs

The Access Navigator may have one or two Controller cards, installed in the slots marked Controller A and Controller B. At least one Controller card is required. If there is only one Controller card, by default it will be the "active" card.

The Access Navigator can also be equipped as redundant, with two Controller cards. Either Controller card can be made active during setup. The other Controller card remains in a standby state, ready to take over in the event that the active Controller fails or is taken out of service. Both Controller cards keep identical data bases, so that either card can take over and maintain all existing call connections.

NOTE: One Controller card must always be active, indicated by a green Active status LED. If there are two Controller cards (protected system), one Controller will be active (Active status LED lights green) and one Controller will be in standby (Active status LED will be off).

Table 14-10. Active/Standby Controller Status LEDs

LED State	Description	Troubleshooting
Off	Controller card is in standby.	LED will be off if Controller card is in standby or is not operational. Use the **status equipment** command for additional information.
Green	Controller card is active.	**Caution**: Do not remove or replace an active Controller card if there are calls in progress. In an unprotected system (one Controller card), the system must be taken offline for service. In a redundant system, use the **switch controller** command to put the Controller card in standby before removing.

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Critical Alarm Status LEDs

A critical alarm means that a fault exists that affects more than 128 call lines. A critical alarm requires an immediate maintenance response. No critical alarms are currently defined for the Access Navigator.

Table 14-11. Critical Alarm Status LEDs

LED State	Description	Troubleshooting
Off	No critical alarms present.	Alarms appear only on the active Controller.
Red	Critical alarm exists.	Use the states of the Active/Standby status LEDs and DS1 status LEDs to help locate the source of the fault.

Major Alarm Status LEDs

A major alarm means that a fault exists that affects 24 or more call lines. A major alarm requires a prompt maintenance response. Major faults include:

- DS1 loss of signal (LOS)
- DS1 loss of frame (LOF)
- DS1 interface receives alarm indication signal (AIS)
- DS1 interface receives remote alarm indication (RAI, yellow alarm)
- DS1 Quad Framer card failed or was removed

Table 14-12. Major Alarm Status LEDs

LED State	Description	Troubleshooting
Off	No major alarms present	Alarms appear only on the active Controller.
Red	Major alarm exists	Use the state of the Power LEDs, Active/ Standby status LEDs, and DS1 status LEDs to help locate the source of the fault.

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Minor Alarm Status LEDs

A minor alarm means that a non-service affecting condition exists, or that a condition exists affecting service to few customer lines (2 to 23) or has the potential to affect traffic, or that a protection switch occurred. Minor faults include:

- IDLC link failure (primary or secondary EOC/TMS fails) if backup is active
- IDLC link out of service because of loopback test
- Standby Controller card removed or failed
- Self-test failure (in redundant system)
- Power input -48V missing or too low

Table 14-13. Minor Alarm Status LEDs

LED State	Description	Troubleshooting
Off	No minor alarms present	Alarms appear only on the active Controller.
Yellow	Minor alarm exists	Use the state of the Power LEDs, Active/ Standby status LEDs, and DS1 status LEDs to help locate the source of the fault.

Alarm Cutoff (ACO) Status LED

The Alarm Cutoff feature permits the operator to temporarily silence the alarm outputs while testing and repairing the Access Navigator. ACO does not stop DS1 alarm messages.

Pressing the ACO pushbutton switch disables the alarm relays and lights the ACO status LED. This keeps the relay contacts open on the Alarm Output connector. If another alarm occurs, the alarm relays will be enabled again and the ACO status LED will go off.

Alarm Cutoff disables the following signals on the Alarm Output connector:

- Critical alarm
- Major alarm
- Minor alarm

Table 14-14. Alarm Cutoff (ACO) Status LEDs

LED State	Description	Troubleshooting
Off	Alarm(s) active	Normal operation. Any alarms will produce relay closures on the Alarm Output connector.
Yellow	Alarm(s) suppressed	ACO disables the alarm relays so that all contacts remain open on the Alarm Output connector.

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DS1 Status LEDs

Each Quad T1 Framer (QF) card has status indicators for four DS1s. The Access Navigator holds up to 8 QF cards, providing up to 32 DS1 circuits.

There are a total of 32 DS1 status LEDs on the front control panel, arranged in groups of 4, corresponding to the 4 DS1 interfaces of each installed QF card. An LED will be off if the associated DS1 interface is out of service or if there is no installed Quad Framer card for that interface. In order to display the many DS1 status states, each DS1 LED will show a specific color (red, yellow, green) and duty cycle (off, on, flash slow, flash fast).

Table 14-15. DS1 Status LEDs

LED State	Description	Troubleshooting
Off	Off-line	Individual DS1s can be taken out of service by using the **set ds1 down** command and put into service using the **set ds1 up** command.
Green	Normal operation	Normal operation.
Green Flashing	Loopback test in progress	Tests may be initiated by local or remote commands. Local self-tests are initiated using the **set ds1 line loopup** and **set ds1 payload loopup** commands. Remote tests use ANSI T1.403 in-band or FDL commands.
Red	Loss of signal (LOS)	When the receiving unit detects a failure, it will display a red alarm and send a T1 yellow alarm signal upstream toward the cause of the problem (such as a cut cable). Normally, the location of the fault is somewhere between the units displaying the red and yellow alarms.
Red Flashing Fast	Self-test failure	Retest DS1 using **test ds1** command. If test fails again, replace Quad Framer card with known good card and test again.
Red Flashing Slow	Loss of frame (LOF) and/or Alarm indication signal (AIS)	T1 problem exists, but the line is intact. LOF indicates an upstream T1 transmit problem exists, or that there is a framing mismatch (ESF and D4) at the two ends. An AIS (blue alarm) message is transmitted downstream to indicate an upstream problem exists.

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Table 14-15. DS1 Status LEDs (Continued)

LED State	Description	Troubleshooting
Yellow	Line code violation (LCV)	The DS1 interface received an LCV transmission error. LCVs can occur with faulty wiring, poor signal quality, or a line code mismatch (AMI and B8ZS) at the two ends.
Yellow Flashing	Yellow alarm	The Access Navigator will display a yellow alarm when it receives an LOS alarm signal. (See red LED state discussion.)

Ethernet Link Status LED

NOTE: An Ethernet connection is required for management by SNMP and Telnet CLI.

The Ethernet Link Status LED is located on the rear panel, next to the Ethernet connector.

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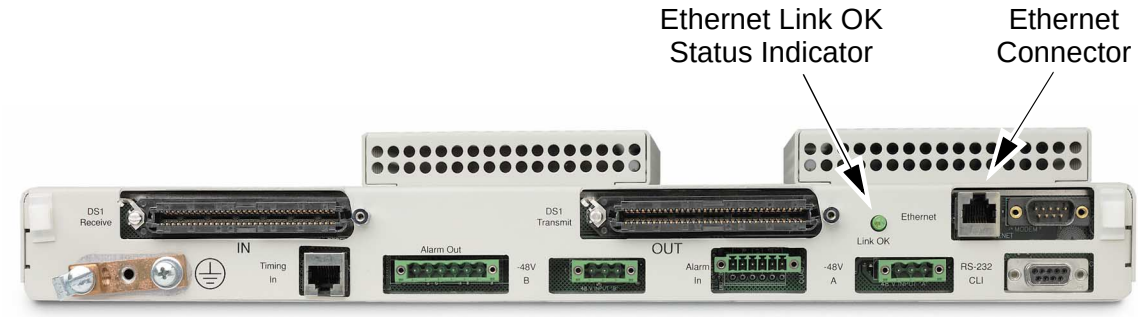

Figure 14-2. Ethernet Indicator on Rear Panel

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Table 14-16. Ethernet Link Status LED

LED State	Description	Troubleshooting
Off	No link or connection	Check cable connections.
Green	Link okay	LED lights in response to presence of Ethernet timing pulses. A green LED indicates that the Ethernet link is okay, but does not verify that the Access Navigator is receiving or processing Telnet. (See note above.)

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CHAPTER 15

Diagnostics & Troubleshooting

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Operations Interface

CLI alarm identification requires RS-232 or Telnet connections to the Access Navigator for displaying status, settings, logs, and performance monitoring data. EOC alarms are reported directly to the GR-303 switch, while SNMP traps are reported to the Network Management System.

The Access Navigator operating system provides a Command Line Interface (CLI), which uses simple text based commands and messages.

Alarms

The Access Navigator monitors both internal operation and network traffic flow. When a service-affecting event occurs, the Access Navigator provides an alarm to alert the operator. Use the CLI **alarms** command to display current alarms (see *Alarms* on page 18-25).

Alarms are events that produce audible/visual indications or messages to the management interfaces. There are four alarm severities. Access Navigator alarms have five levels of severity. Only the first three provide front panel indications and alarm relay outputs. Manually set alarms used for testing (see *Set Alarms* on page 18-95) are not reported over the EOC to the GR-303 switch.

- **CRITICAL** alarms affect service to 128 or more subscribers, with a single failure. (Only the manually set critical alarm is currently defined.)
- **MAJOR** alarms affect service to 24 or more subscribers, with a single failure. Since each DS1 (or T1) carries 24 DS0s, the loss of traffic on one or more DS1s will produce a major alarm. A major alarm can be caused by an external event (such as a cut T1 line) or an internal problem (such as a failed T1 card).

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- **MINOR** alarms affect service to 2 to 23 subscribers, or reduce service reliability. A minor alarm will occur if a redundant element fails, such as a Controller card, power supply, or GR-303 control channel.
- **WARNING** alarms (GR-303 only) indicate a service state change.
- **ALERT** alarms are non-service affecting, but indicate a quality problem. Alerts will occur when monitored traffic events exceed user-set thresholds.

Alarm Reporting

Access Navigator reports alarms in several ways:

- **Alarm Indicators**. LED indicators on the front panel (see Figure 15-2) show critical, major, and minor alarms, as well as system, power, and DS1 status.
- **Alarm Relay Outputs**. The Access Navigator has alarm relays that are activated by critical, major, and minor alarms. These three relays provide dry contact closures for connection to the office facility's alarm system.
- **Alarm Inputs**. External contact closures can be reported.
- **CLI Alarm Messages**. The control interface provides alarm messages and log status reports to aid the operator in locating problems and monitoring events.
- **EOC Alarm Messages**. Access Navigators with the GR-303 option provide alarm message reporting to the switch over the Embedded Operations Channel (EOC) in the GR-303 interface group DS1s.
- **SNMP Trap Reports**. Traps are generated when certain events occur (see *SNMP Trap Reports* on page C-9).The Access Navigator can send these reports to up to three Network Management System (NMS) IP addresses.

Alarm Testing

Access Navigator alarm functions can be manually tested using the following command for setting critical, major, and minor alarms. Turning alarms on or off will produce alarm messages and log entries stating that the alarm event was manually set or cleared by the user. Manually set alarms are not reported over the GR-303 EOC link to the switch.

Syntax: **`set alarms <critical|major|minor> <on|off>`**

Alarm and Status Indicators

The Access Navigator front and rear panels provide the following alarm and status indicators. For detailed information, see *Alarm and Status Indicators* on page 15-8.

- Power
- Active (Controller)
- Critical alarm
- Major alarm
- Minor alarm

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- Alarm Cutoff (ACO)
- DS1 status
- Ethernet status

Facility Alarm System

The Access Navigator has alarm relay outputs for connection to the facility alarm system (see *Alarm Output Connections* on page 6-27). Separate alarm outputs are provided for critical, major, and minor alarms.

Alarm Cutoff (ACO)

The ACO function enables the operator to turn off all alarm relay outputs from the Access Navigator to the facility alarm system. If logged into the Access Navigator via RS-232 or Telnet, use the **aco** command (see *ACO* on page 18-23). If standing next to the Access Navigator, press the ACO pushbutton switch on the Controller displaying the alarm indication (see Figure 15-2).

The ACO indicator will light while the alarm relays are cut off. The ACO function will be reset if a new alarm event occurs with the same severity (critical, major, minor). Normal operation will resume when all alarms have been cleared.

Alarm Signaling – Red, Yellow (RAI), Blue (AIS)

Traditional telecommunications alarm signals were assigned colors:

- **RED** – a local alarm such as LOF or LOS
- **YELLOW** – an alarm signal returned back toward the failure. The yellow signal is officially called a Received Alarm Indicator (RAI).
- **BLUE** – an alarm signal forwarded to the next element. The blue signal is officially called an Alarm Indication Signal (AIS).

Simply stated, when a DS1 network element sees red, it returns yellow and forwards blue.

The Access Navigator responds to received red and yellow DS1 alarm signals and detects Loss of Frame (LOF) and Loss of Signal (LOS) alarms (see Figure 15-1). Blue alarms are not forwarded because the Access Navigator is a 1:0 digital crossconnect switch (DCS). Instead of sending an all-ones blue alarm pattern over the forwarded DS1s, the DS1 interface forwards an all-ones pattern over each affected DS0. In a 1:0 DCS the 24 DS0s in each received DS1 may be split into different DS1 paths. Consequently, DS1 blue alarm signaling is not allowed on the forwarded DS1s because this would interrupt valid traffic on DS0s received by other DS1s.

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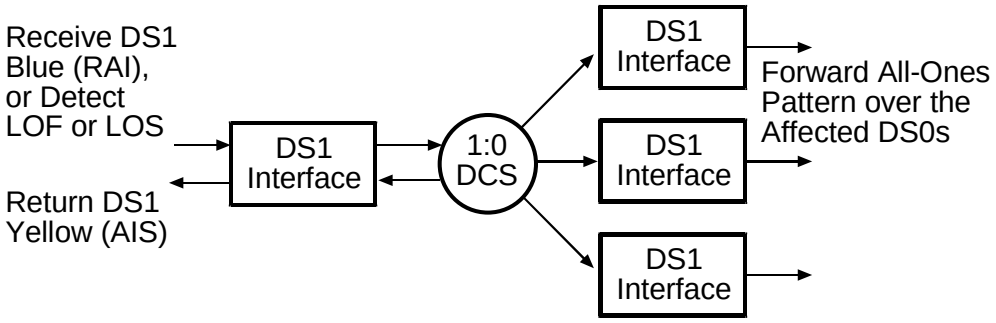

Figure 15-1. Access Navigator Alarm Signal Response

Access Navigator DS1 interfaces respond as follows:

1. Display red alarm status on Access Navigator
2. Return yellow alarm pattern (01000000) over same DS1
3. Forward all-ones alarm pattern (11111111) over the 24 DS0s

DS1 Failures

In the event of a DS1 failure, the Access Navigator / GR-303 sends an on-hook signal toward the switch for each affected DS0 to terminate the calls.

Event Log

In addition to recording alarm events, the Access Navigator maintains a log of the most recent 400 alarms and informational (info) events that do not affect service. The Access Navigator maintains a log of the following event types.

- Critical alarms
- Major alarms
- Minor alarms
- Informational events

Log reports are available using the CLI **`log`** command (see *Log* on page 18-38). You can also filter the log reports to display only certain event types, as well as only equipment or DS1 events.

Syntax: **`log`**

Displays all log events except BERT, TMC, and Configuration change events.

Syntax: **`log <major|minor|alert|info>`**

Displays only alarms with a specified severity.

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Syntax: **log ds1** <*n*>

Displays only DS1 alarms.

Syntax: **log ds1** <*n*> <**major|minor|alert|info**>

Displays only DS1 alarms with a specified severity level.

Syntax: **log equipment**

Displays only equipment alarms.

Syntax: **log equipment** <**major|minor|alert|info**>

Displays only equipment alarms with a specified severity level.

Syntax: **log info**

Displays only informational events.

Syntax: **clear log**

Erases all data in the log file.

Configuration Change Log

The Access Navigator maintains a log of the most recent 500 configuration changes in a separate log file, which can be displayed using the CLI **log config** command (see *Log Config* on page 18-41). Filtering options allow the user to display selected events. The Access Navigator also records the Management Interface causing the change – CLI, EOC, SNMP, or ICC (inter-controller commands).

Syntax: **log config**

Displays all configuration log events.

Syntax: **log config ds0** <*n:ch*>

Displays only the configuration management events affecting a DS0 channel or range of channels.

Syntax: **log config ds1** <*n*>

Displays only the configuration management events affecting a DS1 or range of DS1s.

Syntax: **log config crv** <*value*>

Displays only the configuration management events affecting a CRV or range of CRVs.

Syntax: **log config source** <**cli|eoc|snmp|icc**>

Displays only the configuration management events from a management interface.

Syntax: **clear config log**

Erases all data in the configuration change log file.

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BERT Log

Using CLI commands, the Access Navigator can perform a variety of Bit Error Rate Tests. BERT data is recorded in a separate log file, which can be displayed using the CLI **`log bert`** command (see *Log BERT* on page 18-40). Filtering options allow the user to display selected events. The Access Navigator records the following BERT data.

- FBE – Number of Frame Bit Errors in one-second interval
- BE – Number of Bit Errors in one-second interval
- CRC – Number of Cyclical Redundancy Check errors in one-second interval
- BPV/LCV – Number of Bi-Polar Violations and Line Code Violations in one-second interval

Syntax: **`log bert`**

Displays only BERT events.

Syntax: **`clear bert log`**

Erases all data in the BERT log file.

TMC Log

The Access Navigator / GR-303 records Timeslot Management Channel data for the most recent 200 error reports in a separate log file. TMC data can be displayed using the CLI **`log tmc`** command (see *Log TMC* on page 18-43). Command options allow the user to display data for permanent (off-hook) call states and specific CRV numbers.

Syntax: **`log tmc`**

Displays all configuration events.

Syntax: **`log tmc permanent`**

Displays only TMC events for permanent (off-hook) call states.

Syntax: **`log tmc crv`** *<value>*

Displays only CRV events for a specific value, 1 to 768.

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Alarm and Status Indicators

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Indicator Locations

The Access Navigator provides LEDs for displaying status indications. Figure 15-2 shows the indicators on the Access Navigator front panel, and Figure 15-3 shows the rear panel.

- Each Controller card (A and B) has its own set of indicators, but only the power status indicator will light on the standby Controller card.
- Each Quad T1 Framer (QF) card has status indicators for four DS1s. The Access Navigator holds up to 8 QF cards, providing up to 32 DS1 circuits. DS1 indicators will not light for DS1s that are not installed or in service.

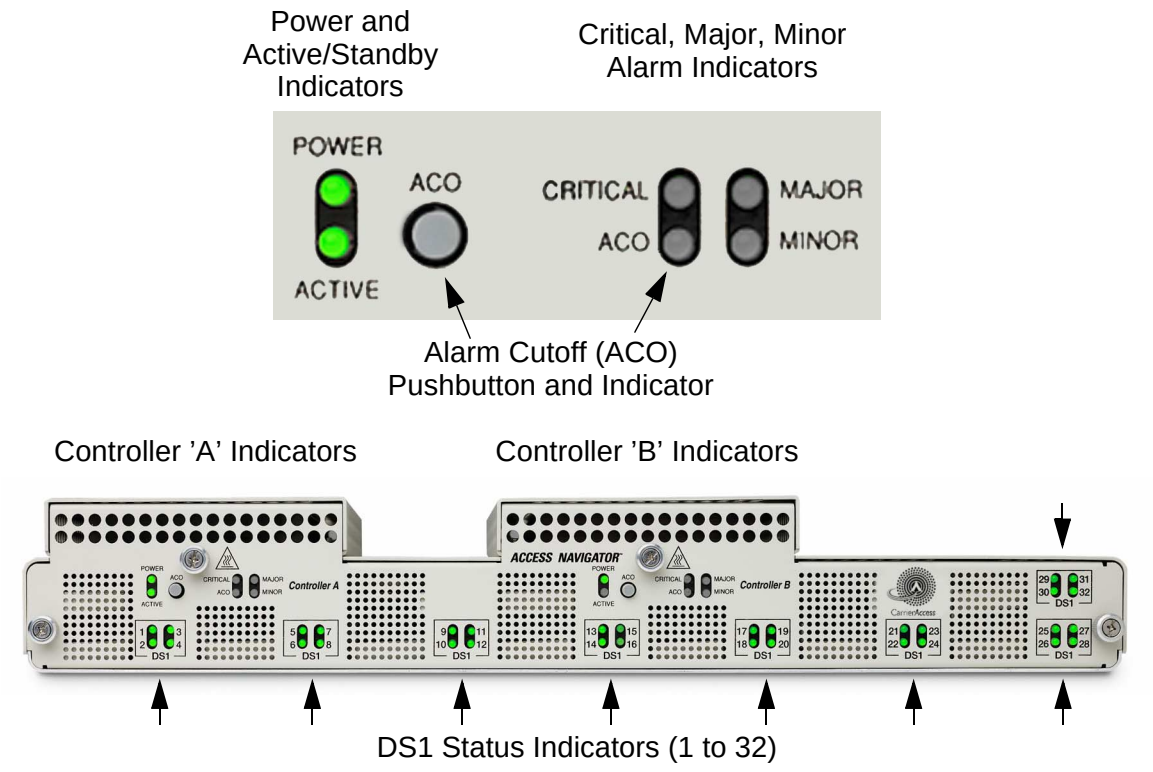

Figure 15-2. Front Panel Indicators

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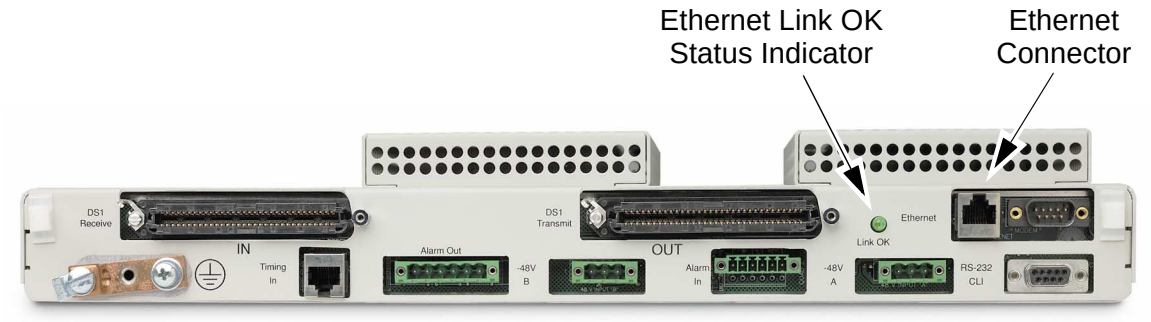

Figure 15-3. Rear Panel Ethernet Indicator

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Indicator Descriptions

Each Controller card provides the following indicators (see Table 15-1). Only the active Controller card will show alarm and status information. The LED on the active Controller will light green. On the standby Controller, only the Power status indicator will light. The Power LED will light on the active Controller.

NOTE: Note: Normal LED states are shown in **Boldface** type.

Table 15-1. Indicator Descriptions

LED	State	Description
Power (Two LEDs, one for each Controller card)	Off Red Yellow **Green**	-48V power failure. Internal power supply failure. Card is booting up. Normal operation.
Active (Controller)	Off **Green** Yellow	Controller card is standby. Controller card is active. Insufficient memory. SIMM (memory module) is required.
Critical Alarm	**Off** Red	No critical alarms present. Critical alarm exists.
Major Alarm	**Off** Red	No major alarms present. Major alarm exists.
Minor Alarm	**Off** Yellow	No minor alarms present. Minor alarm exists.
ACO (alarm cut-off)	**Off** Yellow	Alarm(s) active. Alarm(s) suppressed.
DS1 Status (Each Quad T1 Framer card has four LEDs)	Off Red Red Flashing Slow Red Flashing Fast Yellow Yellow Flashing **Green** Green Flashing	Off-line. Loss of signal (LOS). Out of frame or AIS. Self-test failure. Line code violation (LCV). Yellow alarm. Normal operation. Loopback test in progress.
Ethernet (on rear panel)	Off **Green**	No link or connection. Normal operation.

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Status and Performance

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- Status Equipment ... 15-19
- Status IP ... 15-20
- Status Remote ... 15-21

Status Clock

Displays the currently active clock source, along with the primary and secondary clock settings and clock source status.

Syntax: **`status clock`**

Message:

```
Active Clock Source: DS1 12

Primary:
 Clock Source:   DS1 12
 Clock Status:   In Service
Secondary:
 Clock Source:   INTERNAL
 Clock Status:   In Service
```

Description:

Item	Description
Active Clock	The clock source currently being used.
Clock Source	DS1 number – DS1 clock recovered by receiver.
BITS – external Building Integrated Timing Supply.	
INTERNAL – internal Stratum clock oscillator.	
Clock Status	In Service (working), Out of Service.

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Status DS0

Displays the status for each DS0 specified (up to 24).

Syntax: **`status ds0`** *<n:ch>*

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.

Example: **`status ds0 32:1-4`**

Shows status of DS1 #1, DS0 channels 1 to 4. The message would look similar to the following:

Message:

```
Interface                Status
---------                ------
DS1 1 Channel 1          In Service
DS1 1 Channel 2          In Service
DS1 1 Channel 3          In Service
DS1 1 Channel 4          User set Out of Service
```

Description:

Item	Description
Interface	Lists DS1 number and DS0 channel number.
Status	In Service – DS0 is up User set Out of Service – User set DS0 down Card Not Installed – Empty card slot (CLI also displays alarm messages.)

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Status DS1

Displays a detailed DS1 service status message. (For a short status summary, use the **`status ds1 all`** command.)

Syntax: **`status ds1`** *<n>*

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 12`**

Example: **`status ds1 1-4`**

Message:

```
Status for DS1 1:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   None
    Remote Device Mgmt Type:    CA FDL
    Remote Device Mgmt Status:  In Service

Status for DS1 2:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   T1403
    Remote Device Mgmt Type:    None

Status for DS1 3:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   None
    Remote Device Mgmt Type:    None

Status for DS1 4:
    Receive:                    Loss of Signal
    Transmit:                   RAI/Yellow Alarm
    Loop:                       None
    State:                      User set Out of Service
    FDL Type:                   None
    Remote Device Mgmt Type:    None
```


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Description:

Item	Description
Receive	Traffic – normal operation. (The CLI also shows alarm conditions.)
Transmit	Traffic – normal operation. (The CLI also shows alarm conditions.)
Loop	None – normal operation.Line – line loopback. Payload – payload loopback.
State	In use as DROP – Subscriber "drop" DS1. In use as GROOM – DCS "groom" DS1. In Service – GR-303 "switch" DS1. User set Out of Service – User set DS1 down. Card Not Installed – Empty card slot (The CLI also displays alarm messages such as RAI.)
FDL Type	None – No detection or response (only option for switch DS1s). SLC96 – Required for Shelf A of SLC-96/TR-08 group. T1403 – Detects and responds to ANSI T1.403 codes. (See *Set DS1 FDL* on page 18-106.)
`Remote Device Mgmt Type`	None – no management CA FDL – Used to provision remote Access Bank II or establish pass-through management session to Adit 600. CA IP <*ipaddress*> – Used for IP DS0 management of remote Adit 600. CA DS1 <*n*> – Used for IP DS0 management of remote Adit 600. (See *Set DS1 Remote Device Mgmt* on page 18-113.)
Remote Device Mgmt Status	Up or Down – Shown only if Remote Device Mgmt Type is CA IP or CA FDL.

Status DS1 All

Displays an abbreviated list showing the status for all 32 DS1 circuits. It produces a message similar to the following, showing the DS1 number, current status, and some common parameters of interest in trouble-shooting. (To obtain a detailed list for a specific DS1 or range of DS1s, use the **`status ds1`** <*n*> command.)

Syntax: `status ds1 all`

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Message:

```
                                                                  Clock
DS1 Status                      FDL    Remote Device Management   Source
--- --------------------------  -----  ------------------------  ---------
 1  In use as DROP              None   CA FDL  In Service
 2  User set Out of Service     T1403  None    n/a
 3  In use as DROP              None   None    n/a
 4  In use as DROP              None   None    n/a
 5  In use as DROP              None   None    n/a
 6  In use as DROP              None   None    n/a
 7  In use as DROP              None   None    n/a
 8  In use as DROP              None   None    n/a
 9  In use as DROP              SLC96  None    n/a
10  In use as DROP              None   CA IP   In Service
11  In use as DROP              None   DS1 10  n/a
12  In use as DROP              None   None    n/a
13  In use as DROP              None   None    n/a
14  In use as DROP              None   None    n/a
15  In use as DROP              None   None    n/a
16  In use as DROP              None   None    n/a
17  In use as DROP              None   None    n/a
18  In use as DROP              None   None    n/a
19  In use as DROP              None   None    n/a
20  Facility failure            None   None    n/a
21  In use as GROOM             None   None    n/a
22  In use as GROOM             None   None    n/a
23  User set Out of Service     None   None    n/a
24  User set Out of Service     None   None    n/a
25  In Service                  None   None    n/a               Primary
26  In Service                  None   None    n/a
27  In Service                  None   None    n/a
28  In Service                  None   None    n/a
29  In Service                  None   None    n/a               Secondary
30  In Service                  None   None    n/a
31  User set Out of Service     None   None    n/a
32  User set Out of Service     None   None    n/a
```

Description:

Item	Description
DS1	DS1 number, 1 to 32
Status	In use as DROP – Subscriber “drop” DS1. In use as GROOM – DCS “groom” DS1. In Service – GR-303 “switch” DS1. User set Out of Service – User set DS1 down. Card Not Installed – Empty card slot (The CLI also displays alarm messages such as RAI.)
FDL	None – No detection or response (default for switch DS1s). CAC – Required to provision remote Access Bank II. SLC96 – Required for Shelf A of SLC-96/TR-08 group. T1403 – Detects and responds to ANSI T1.403 codes.

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Item	Description
Remote Device Management	n/a – not applicable CA FDL – Used to provision remote Access Bank II or establish pass-through management session to Adit 600. CA IP – Used for IP DS0 management of remote Adit 600. CA DS1 <*n*> – Used for IP DS0 management of remote Adit 600. In Service – Management link is in service (up) Out of Service – Management link is out of service (down). (See *Set DS1 Remote Device Mgmt* on page 18-113.)
Clock Source	Indicates Primary or Secondary if DS1 line receiver is used for master clock source

Status DS1 Performance

Displays current performance data for the specified DS1. The Access Navigator accumulates DS1 performance data for the parameters described in RFC 1406 – *Definitions of Managed Objects for the DS1 and E1 Interface Types*. All performance parameters are accumulated in fifteen minute intervals. The "current" 15 minute interval shows data collected when the command is received, and always represents an elapsed time of less than 15 minutes. At the end of each 15 minute interval, the Access Navigator displays the total as the "previous" 15 minute interval and computes new totals for 1 hour and 1 day by summing previous intervals.

The **`clear ds1 performance`** command can be used to reset the performance data for a specific DS1. When this is done, the timer for that DS1 will start at zero hours, minutes, and seconds. (See *Clear DS1 Performance* on page 15-18.)

The **`status performance`** message will include an asterisk (*) to mark error counts that exceed the threshold values set by the *Set DS1 Threshold* on page 18-115. Exceeding a threshold can cause an automatic alarm message to be sent to the network operations center.

Syntax: **`status ds1`** <*n*> **`performance`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 9 performance`**

Message:

```
Performance Statistics for DS1 #9
                                 current  previous
                                15 min.   15 min.     hour       day
                               --------  --------  --------  --------
unavailable seconds:                  0         0         0         0
errored seconds:                      1         0       577*    29377*
severely errored seconds:             0         0         0         0
sev. errored frame seconds:           0         0         0         0
```


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```
line errored seconds:                1        0        0        0
controlled slip seconds:             0        0        0        0
bursty errored seconds:              1        0        0        0

degraded minutes:                    0        0        0        0
line code violations:                3        0        0        0
path code violations:                1        0        0        0

elapsed time in current 15 min. interval:  4:25
valid 15 min. intervals in hour:             3
valid 15 min. intervals in day:             35
* indicates threshold has been exceeded.
```

NOTE: For definitions of performance data, see *Status DS1 Performance* on page 18-162.

Status DS1 Performance History

Displays a tabular list of performance data for the specified DS1 during each 15-minute interval and the count totals for the day. Performance history shows the most recent 96 intervals.

The **`clear ds1 performance`** command can be used to reset the performance data for a specific DS1. When this is done, the timer for that DS1 will start at zero hours, minutes, and seconds. (See *Clear DS1 Performance* on page 15-18.)

Syntax: **`status ds1`** <*n*> **`performance history`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 9 performance history`**

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Message:

```
        Performance Statistics for DS1 #9

                      UAS   ES  SES SEFS  LES  CSS  BES   DM     LCV     PCV
                     ---- ---- ---- ---- ---- ---- ---- ---- ------- -------
      curr. interval:     0  822    0    0    0    0  822   13       0       0
      prev. intvl  1:     0  900    0    0    0    0  900   15       0       0
      prev. intvl  2:     0  900    0    0    0    0  900   15       0       0
      prev. intvl  3:     0  900    0    0    0    0  900   15       0       0
      prev. intvl  4:     0  900    0    0    0    0  900   15       0       0
      prev. intvl  5:     0  900    0    0    0    0  900   15       0       0
      prev. intvl  6:     0  577    0    0    0    0  577   10       0       0
      prev. intvl  7:     0    0    0    0    0    0    0    0       0       0
      prev. intvl  8:     0    0    0    0    0    0    0    0       0       0
      prev. intvl  9:     0    0    0    0    0    0    0    0       0       0
      prev. intvl 10:     0    0    0    0    0    0    0    0       0       0

      prev. intvl 94:     0    0    0    0    0    0    0    0       0       0
      prev. intvl 95:     0    0    0    0    0    0    0    0       0       0
      prev. intvl 96:     0    0    0    0    0    0    0    0       0       0
                     ==== ==== ==== ==== ==== ==== ==== ==== ======= =======
      totals:           0 5899    0    0    0    0 5899   88       0       0

      elapsed time in current 15 min. interval:  13:42
      valid 15 min. intervals in hour:               3
      valid 15 min. intervals in day:               96
```

NOTE: For definitions of performance history data, see *Status DS1 Performance History* on page 18-165.

Clear DS1 Performance

Clears only the performance data for the specified Access Navigator DS1, setting all error counters back to zero. This command does not reset the interval timer, so that new errors will only be accumulated for the remainder of the “current” 15 minute interval. This may affect the totals shown for the “previous” 15 minute, 1 hour, and 1 day intervals.

Syntax: **`clear ds1 <n> performance`**

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Status Equipment

Display the status of all cards installed in the Access Navigator. After giving the command, a message similar to the following will appear.

Syntax: **`status equipment`**

Message:

```
Equipment      Status              Version
---------      ------              -------
Controller A   Active              01.60 GR-303 Option
Controller B   Standby             01.60 GR-303 Option
DS1 Card 1     Installed            1
DS1 Card 2     Installed            1
DS1 Card 3     Installed            1
DS1 Card 4     Installed            1
DS1 Card 5     Installed            1
DS1 Card 6     Installed            1
DS1 Card 7     Card not installed
DS1 Card 8     Card not installed
```

Description:

Item	Description
Equipment	Lists card type and card slot. Controller - Slots A and B only. DS1 Card - Slots 1 through 8 only.
Status	Active - The Controller card is active. Standby - The Controller card is in standby. Unknown - Card installed but not responding. Installed - Card installed. Card Not Installed – Empty card slot. Card Failed - transient message indicating standby Controller failed software update and will reboot.
Version	Controller - Firmware version plus options. DS1 Card - Version of card.

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Status IP

The Ethernet port on the Access Navigator provides an Internet Protocol (IP) interface. Currently, the **`show ip`** and **`status ip`** commands produce the same message, listing the IP address and subnet mask, and the gateway address.

Syntax: **`show ip`**

Syntax: **`status ip`**

Message:

```
IP Address and Mask:        192.168.118.65 255.255.255.0
IP Address of the Gateway:  192.168.0.250
```

Description:

Item	Description
IP Address	Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *`xxx.xxx.xxx.xxx`*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type **none** for the IP address.
Mask	The Access Navigator uses a subnet mask to identify the permissible range of addresses for each IP address. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Subnet masks have the format *`xxx.xxx.xxx.xxx`*, where each xxx is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *`255.255.0.0`* and *`255.255.255.0`*. If a subnet mask is not used, type **none** or leave blank.
Gateway	A gateway is any device that passes packets from one network to another network in their trip across the Internet. Gateway addresses have the same format as IP addresses. If a gateway address is not used, you must enter **none** for the gateway address.

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Status Remote

Displays a message listing the remote terminals at the far end of the DS1s. The command syntax lets the operator request a specific DS1, range of DS1s, or all DS1s. The Access Navigator can identify Carrier Access remote terminals, such as the Access Bank II and Adit 600, over the DS1 FDL channel.

Syntax: **`status remote <n|all>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
all	Display all DS1 remote interfaces.

Example: **`status remote all`**

Example: **`status remote 1`**

Example: **`status remote 1-7`**

Message:

```
DS1  Terminal              ID                     Status
---  --------------------  ---------------------  --------------
  1  CA Adit 600           Remote Device #1       In Service as CA IP
  2  n/a                   n/a                    FDL Not Used
  3  CA Access Bank I      Remote#3               In Service as CAC
  4  CA Access Bank II     Remote#4               In Service as CAC
  5  CA Adit 600           Remote#5               In Service as CA FDL
  6  Unknown               Unknown                In Service as T1403
  7  Unknown               n/a                    Facility failure
```

Description:

Item	Description
DS1	DS1 number, 1 to 32
Terminal	n/a – (not applicable) FDL is not being used. CA Access Exchange CA Access Bank I CA Access Bank II CA Adit 600 Unknown – FDL is being used by unknown terminal.
ID	Remote Terminal Identifier
Status	In Service as CA FDL – FDL is up and using FDL protocol. In Service as CA IP – DS0 link is up and using CA IP protocol. In Service as T1403 – FDL is up and using ANSI T1.403. FDL Not Present – FDL protocol is set to "none". FDL In Progress – Transmitting. Facility failure – FDL is Out of Service.

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GR-303 Status and Performance

- Status CRV ... 15-22
- Status ISDN CRV ... 15-23
- Status EOC ... 15-25
- Status TMC ... 15-25
- Status TMC History ... 15-27
- Clear Blocked Call Count ... 15-28
- Clear Peak Call Count ... 15-28
- Clear Permanent Call Count ... 15-28
- Set CRV Idle ... 15-28

Status CRV

Displays the status of the specified CRV number.

NOTE: In the following command, there can be up to 24 CRVs in a range, such as 1-24 or 110-134. The CRVs do not have to be on the same DS1.

Syntax: **`status crv`** *<range>*

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **`status crv 10`**

Example: **`status crv 5-8`**

Message:

```
CRV     Status            Call Status
---     ------            -----------
4       Not Assigned
5       In Service        Active
6       In Service        Active
7       In Service        Idle
8       In Service        Permanent
9       Assigned to ISDN
```


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Description:

Item	Description
CRV	Call reference value, 1 to 768
Status	The following states may occur: Not Assigned Not Available Assigned to ISDN In Service User set Out of Service Switch set Out of Service Card not Installed Facility failure DS1 Out of Service
Call Status	The following states may occur when CRV is In Service: Active – Call in progress (off hook) Idle – Line available (on hook) Permanent – Line not available because of permanent off-hook state

Status ISDN CRV

Displays a message listing the status of the specified ISDN BRI channels. To display the ISDN BRI channels, you must enter a CRV or range of CRVs.

NOTE: The **`status isdn crv`** command only applies to ISDN BRI channels transported in the GR-303 4:1 TDM mode. Other ISDN BRI channels transported using the 3DS0 mode are set up as digital crossconnections that can be examined using the **`status ds0`** command.

Syntax: **`status isdn crv`** *<range>*

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **`status isdn crv 6`**

Example: **`status isdn crv 1-4`**

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Message:

```
CRV  Chan  Status              Call Status
---  ----  ------              -----------
1    B1    In Service          Active
1    B2    In Service          Active
1    D     In Service          n.a.
2    B1    In Service          Idle
2    B2    In Service          Idle
2    D     In Service          n.a.
3    B1    In Service          Idle
3    B2    In Service          Idle
3    D     In Service          n.a.
4    B1    User set Out of Service
4    B2    User set Out of Service
4    D     User set Out of Service
```

Description:

Item	Description
CRV	Call Reference Value, 1 to 768
Chan	B1 – Bearer channel 1 B2 – Bearer channel 2 D – Signaling channel
Status	The following states may appear: Not Assigned Not Assigned to ISDN Not Available In Service User set Out of Service Switch set Out of Service Under user test control In Loopback Card not Installed Facility failure DS0 is not a drop side GR303 channel DS1 Out of Service
Call Status	The following states may occur when CRV is In Service: Active – Call in progress (off hook) Idle – Line available (on hook) Permanent – Line not available because of permanent off-hook state n.a. – not applicable

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Status EOC

Displays detailed EOC service status message.

Syntax: **`status eoc`**

Message:

```
EOC Status:
 Primary
   Channel:        DS1 #25 channel 12
   Link Status:    Up
   Mode:           Active
 Secondary
   Channel:        DS1 #29 channel 12
   Link Status:    Up
   Mode:           Standby
```

Description:

Item	Description
Channel	Location of EOC, by DS1 and DS0 number.
Link Status	Up – indicates LAPD communications link with switch is established and healthy. Down – out of service. None – no link defined.
Mode	Active or Standby – One EOC is active and the other is in standby. If the active EOC fails, the switch will command the standby EOC to become active.

Status TMC

Provides detailed TMC service status message. Use **`clear`** commands to reset the Blocked Call Count, Peak Call Count, and Permanent Call Count.

Syntax: **`status tmc`**

Message:

```
TMC Status:
 Primary
   Channel:             DS1 #25 channel 24
   Link Status:         Up
   Mode:                Active
   Active Calls:        206
   Permanent Calls:     0
   Peak Calls:          233
   Terminating Calls:   104
```


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```
  Originating Calls:  102
  Blocked Calls:      0
Secondary
  Channel:            DS1 #29 channel 24
  Link Status:        Down
  Mode:               Standby
```

Description:

Item	Description
Channel	Location of TMC, by DS1 and DS0 number.
Link Status	Up – indicates LAPD communications link with switch is established and healthy. Down – out of service. None – no link defined.
Mode	Active or Standby – One TMC is active and the other is in standby. If the active TMC fails, the switch will command the standby TMC to become active.
Active Calls	Number of currently active calls.
Permanent Calls	Number of calls currently set in a permanent off-hook state. This state will be cleared when an on-hook is observed for more than 400 milliseconds.
Peak Calls	Maximum number of calls at one time.
Terminating Calls	Number of calls terminating on subscriber drops at current time.
Originating Calls	Number of calls originating from subscriber drops at current time.
Blocked Calls	Number of calls blocked by Access Navigator or switch. Switch may also refuse call if line configuration is not correct. Blocking can occur because: • Switch side DS0s are not available for call request. • Switch is not configured for call request from CRV.

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Status TMC History

Displays TMC call for the last 48 hours (all) or a range of hours (interval). The resulting messages are similar to the following. (For current status information, see *Status TMC* on page 15-25.)

Use **clear** commands to reset the Blocked Call Count, Peak Call Count, and Permanent Call Count

Syntax: **status tmc <all|*interval*>**

Field	Description
all	Shows all TMC statistics for the last 48 hourly intervals.
interval	Shows statistics for a time interval, such as 8-12 hours.

Example: **status tmc all**

Example: **status tmc 8-12**

Message:

```
TMC Calls History
   int#   date        time      permn.    blocked   peak      switch ports/
                                calls     calls     calls     percent used
   -----  ----------  --------  --------  --------  --------  ------------
   8      04/17/2000  11:48:47  0         0         37        140 / 26
   9      04/17/2000  10:48:47  0         0         85        140 / 61
   10     04/17/2000  09:48:47  0         17        140       140 / 100
   11     04/17/2000  08:48:47  0         0         118       140 / 84
   12     no data for this interval.
```

Description:

Item	Description
int#	One-hour intervals, numbered from 1 to 48.
Date	month/day/year
Time	24-hour clock in hours:minutes:seconds
Permanent Calls	Number of calls currently set in a permanent off-hook state. This state will be cleared when an on-hook is observed for more than 400 milliseconds. (Permanent calls can also be cleared as described in *Clear Permanent Call Count* on page 15-28 and "Set CRV Idle" on page 28.)
Blocked Calls	Number of calls blocked by Access Navigator or switch. (To clear, see "Clear Blocked Call Count" on page 28.) Switch may also refuse call if line configuration is not correct. Blocking can occur because: • Switch side DS0s are not available for call request. • Switch is not configured for call request from CRV.

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Item	Description
Peak Calls	Maximum number of calls at one time. (To clear, see "Clear Peak Call Count" on page 28.)
Switch Ports	Number of DS0 ports connected to the switch (excludes EOC and TMC DS0s).
Percent Used	Percentage of switch ports in use, rounded to nearest whole number.

Clear Blocked Call Count

Sets the blocked call count to zero (see *Status TMC* on page 15-25).

Syntax: **`clear blocked call count`**

Clear Peak Call Count

Sets the peak call count to zero (see *Status TMC* on page 15-25).

Syntax: **`clear peak call count`**

Clear Permanent Call Count

Sets the permanent call count to zero (see *Status TMC* on page 15-25). After clearing the count, the Access Navigator will recalculate the current number of permanent calls.

Syntax: **`clear permanent call count`**

Set CRV Idle

Clears a permanent off-hook call state (see *Status TMC* on page 15-25) by setting it to the normal idle state. After clearing the count, the Access Navigator will recalculate the current number of permanent calls. A call can be active, idle, or permanent. You can check the current call state with the **`status crv`** command. An active call can not be set to idle.

Syntax: **`set crv`** *`<value>`* **`idle`**

Field	Description
value	Call Reference Value, 1 to 768, or a range of values such as 5-8. Maximum range is 24 CRVs.

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Near-End Loopbacks

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

- DS1 Loopdetect ... 15-29
- DS1 FDL Protocol ... 15-29
- DS1 Line Loopback ... 15-30
- DS1 Payload Loopback ... 15-30

DS1 Loopdetect

Enables CSU line loopback testing of the Access Navigator. When loop request code detection is turned on, the Access Navigator will respond to T1.403 defined *in-band* (bit pattern) CSU line loopback request. See Figure 15-4.

On drop DS1s with ESF framing and T1.403 FDL protocol, the Access Navigator will also respond to out-of-band (FDL) loopback requests.

Syntax: **`set ds1`** <*n*> **`loopdetect <on|off>`**

DS1 FDL Protocol

Selects the FDL protocol used on drop DS1s. Switch and groom DS1s do not use FDL. The factory default setting is "none," which also turns off out-of-band (FDL) loopback code detection and transmission over the FDL channel.

The application affects the permissible DS1 Type, Framing, Line Code, FDL, and Remote Management selections. (See *Application Configuration Requirements* on page 18-107.)

Syntax: **`set ds1`** <*n*> **`fdl <none|slc96|t1403>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
none	Disable FDL. (This is the required setting for remote management of Adit 600 terminals. See *Set DS1 Remote Device Mgmt* on page 18-113.)
slc96	Enable communications with Shelf A of SLC-96/TR-08 group. (Supports Access Bank I/TR-08 and line loopback commands.)
t1403	Enable detection and response to ANSI T1.403 bit-patterned codes over the FDL.

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DS1 Line Loopback

Provides a line loopback to verify that the DS1 signal is reaching the Access Navigator's Quad T1 Framer card. The line loopup command creates a connection inside the Line Interface Unit (LIU), causing it to loop the DS1 receive (input) back to the transmit (output). See Figure 15-4.

Syntax: **`set ds1 <n> line <loopdown|loopup>`**

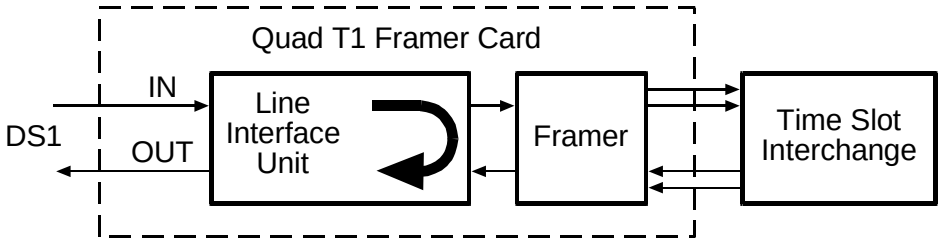

Figure 15-4 DS1 Line Loopback

DS1 Payload Loopback

Provides a payload loopback to verify DS1 signal processing in the Quad T1 Framer card. The payload loopup command creates a signal connection inside the framer, causing it to loop the received payload data back into the framer, where the 24 DS0s are reframed as the DS1 transmit output. See Figure 15-5.

Syntax: **`set ds1 <n> payload <loopdown|loopup>`**

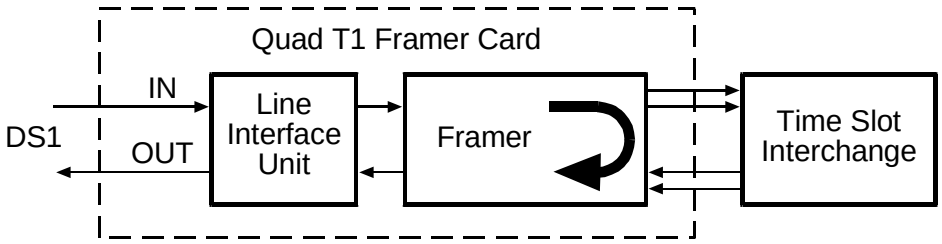

Figure 15-5. DS1 Payload Loopback

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Far-End Loopbacks

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

- DS1 CSU Loopup ... 15-31
- DS1 Line Loopup ... 15-32
- DS1 Network Loopup ... 15-33
- DS1 NIU Loopup ... 15-34
- DS1 Payload Loopup ... 15-35

DS1 CSU Loopup

Sends an *in-band* (bit pattern) line loopup or loopdown code over the drop DS1. The Channel Service Unit (CSU) should loop the received DS1 frame back to the DS1 transmit output. See Figure 15-6.

Note: CSU loopups can be used with either unframed (line) or framed (payload) patterns and test commands.

Note: This command works with ESF framing and T1.403 FDL, or with SLC-96/TR-08 framing for Shelf A. An Access Bank II using CA FDL management will ignore this command.

Syntax: **`send ds1`** <*n*> **`csu`** <**`loopup`**|**`loopdown`**>

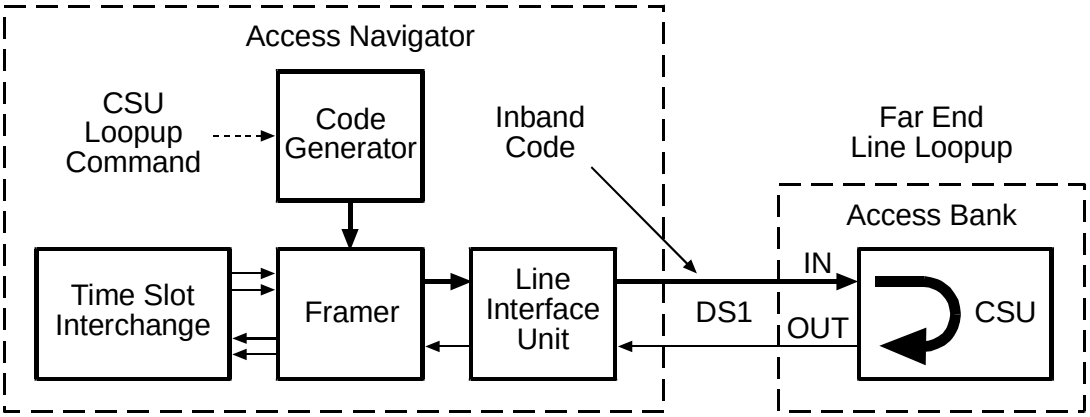

Figure 15-6. Send DS1 CSU Line Loopup

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DS1 Line Loopup

Sends an *out-of-band* (FDL) payload loopup or loopdown code over the drop DS1. The CSU should loop the received DS1 payload back to the DS1 transmit output. See Figure 15-7.

Note: This command works with ESF framing and T1.403 FDL, or with SLC-96/TR-08 framing for Shelf A. An Access Bank II using CA FDL management will ignore this command.

Syntax: **`send ds1`** <*n*> **`line`** <**`loopup`**|**`loopdown`**>

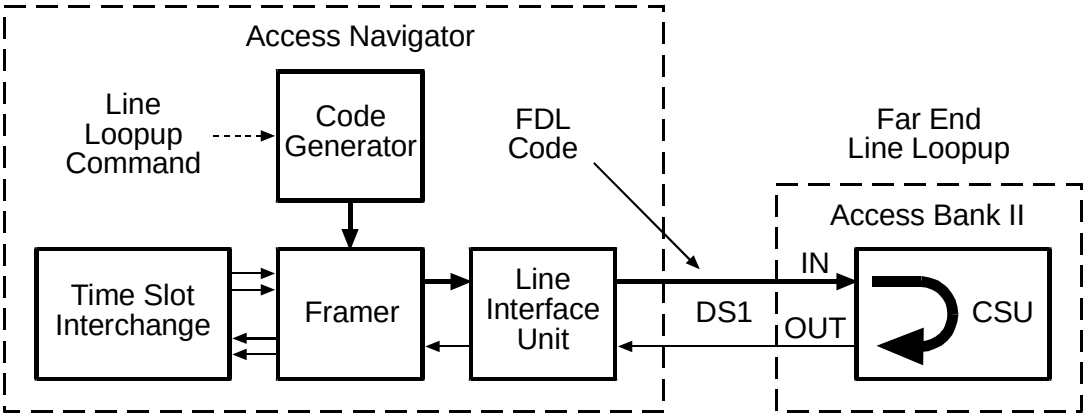

Figure 15-7. Send DS1 Line Loopup

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DS1 Network Loopup

Sends an *out-of-band* (FDL) loopup or loopdown code over the drop DS1. The Network Interface Unit (NIU), such as a "Smart Jack," should loop the received DS1 payload back to the DS1 transmit output. See Figure 15-8.

Note: This command works with ESF framing and T1.403 FDL.

Syntax: **`send ds1 <`***n***`> network <loopup|loopdown>`**

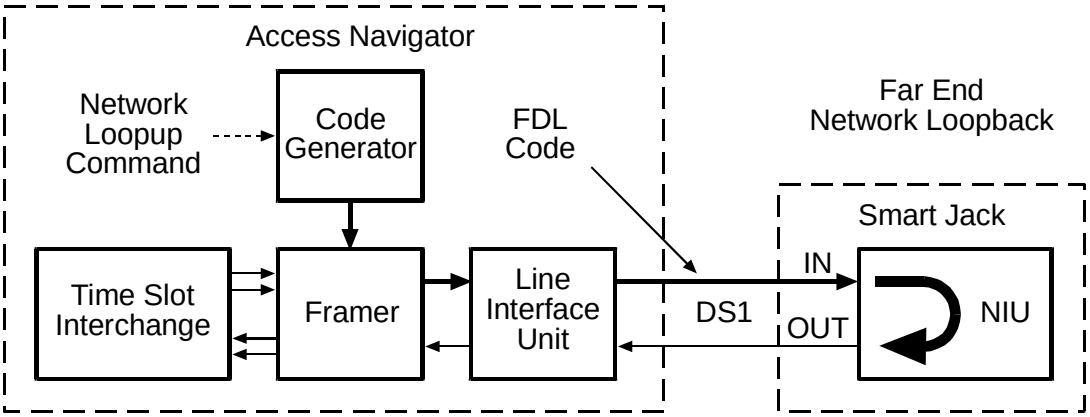

Figure 15-8. Send DS1 Network Loopup

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DS1 NIU Loopup

Sends an *in-band* (bit pattern) line loopup or loopdown code over the Access Navigator DS1. The NIU loopup is used with other commands and test equipment to verify that the DS1 signal is reaching a far-end Network Interface Unit (NIU), such as a "Smart Jack," which should loop the received DS1 payload back to the DS1 transmit output. See Figure 15-9.

Note: This command works with ESF or D4 (SF) framing.

Syntax: **`send ds1`** <*n*> **`niu`** <**`loopup`**|**`loopdown`**>

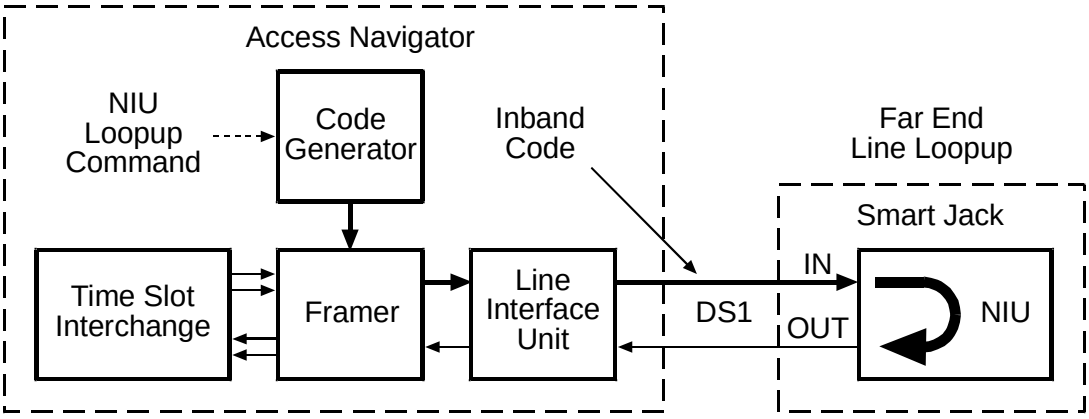

Figure 15-9. Send DS1 NIU Line Loopup

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DS1 Payload Loopup

Sends an *out-of-band* (FDL) payload loopup or loopdown code over the Access Navigator drop DS1. The CSU should perform a payload loopback, which loops the received DS1 payload back to the DS1 transmit output (see Figure 15-10).

Note: This command works with ESF framing and T1.403 FDL.

Syntax: **`send ds1`** <*n*> **`payload`** <**`loopup`**|**`loopdown`**>

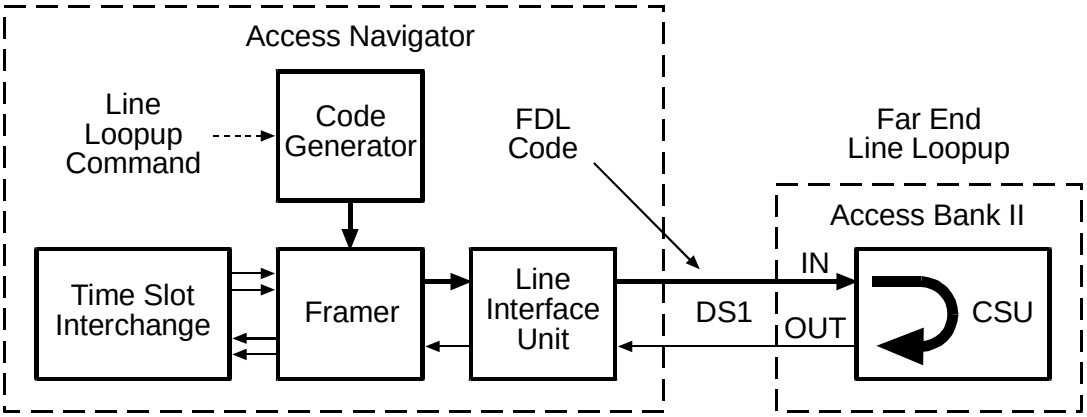

Figure 15-10. Send DS1 Payload Loopup

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Access Bank II Loopbacks

NOTE: All **read remote** and **send remote** commands require that the remote Access Bank II is operational and connected to an Access Navigator drop DS1 using Carrier Access FDL management protocol.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

- Read Remote Loopback ... 15-36
- Send Remote Loopdown ... 15-36
- Send Remote RS232 Line Loopup ... 15-37
- Send Remote RS232 TSI Equipment Loopup ... 15-37
- Send Remote RS232 TSI Network Loopup ... 15-38
- Send Remote SDSL Payload Loopup ... 15-38
- Send Remote T1 Payload Loopup ... 15-39
- Send Remote T1 TSI Loopup ... 15-39
- Send Remote T1 Drop Line Loopup ... 15-40
- Send Remote T1 Drop Payload Loopup ... 15-40
- Send Remote V35 Line Loopup ... 15-41
- Send Remote T1 Drop Line Loopup ... 15-40
- Send Remote T1 Drop Payload Loopup ... 15-40
- Send Remote V35 Line Loopup ... 15-41
- Send Remote V35 TSI Equipment Loopup ... 15-42
- Send Remote V35 TSI Network Loopup ... 15-42

Read Remote Loopback

Reads and displays the loopback status of the remote terminal on the specified DS1. Used to read status of the following **send remote** commands.

Syntax: **read remote** <*n*> **loopback**

Send Remote Loopdown

Disables the **send remote loopup** commands.

Syntax: **send remote** <*n*> **loopdown**

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Send Remote RS232 Line Loopup

This command makes the remote Access Bank II perform a line loopback in the RS-232 interface. This takes the received RS-232 data signal, loops it back in the RS-232 interface, and sends it back to the RS-232 output. See Figure 15-13.

Syntax: **`send remote`** <*n*> **`rs232 line loopup`**

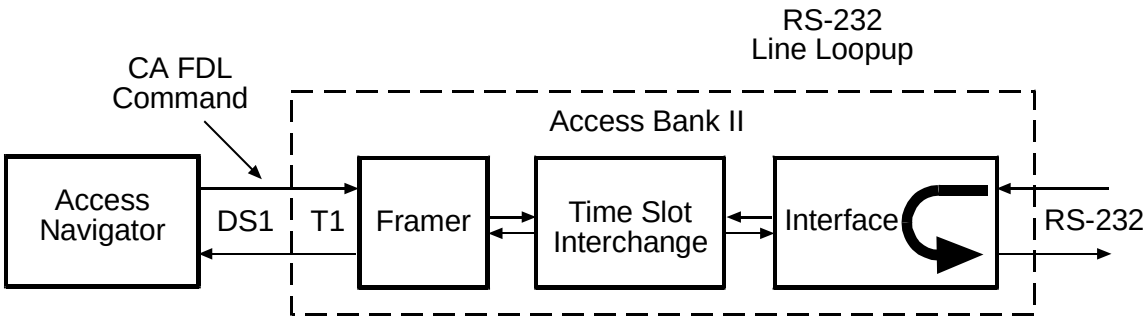

Figure 15-11. Remote RS-232 Line Loopup

Send Remote RS232 TSI Equipment Loopup

This command makes the remote Access Bank II perform an equipment loopback on the RS-232 signal. This takes the received DS0 from the RS-232 equipment interface, loops it in the Time Slot Interchange (TSI), and sends it back to the RS-232 output. See Figure 15-12.

Syntax: **`send remote 9 rs232 tsi equipment loopup`**

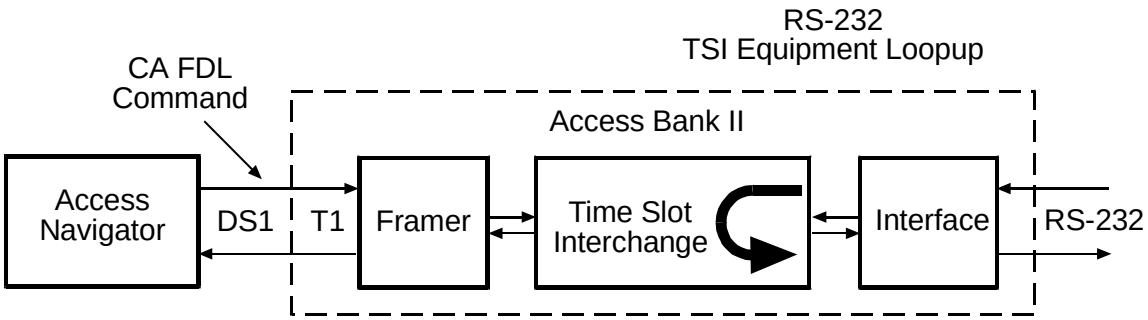

Figure 15-12. Remote RS-232 TSI Equipment Loopup

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Send Remote RS232 TSI Network Loopup

This command makes the remote Access Bank II perform a network loopback on the RS-232 data. This takes the received RS-232 DS0 from the network T1, loops it in the Time Slot Interchange (TSI), and sends it back to the T1 output. See Figure 15-13.

Syntax: **`send remote 9 rs232 tsi network loopup`**

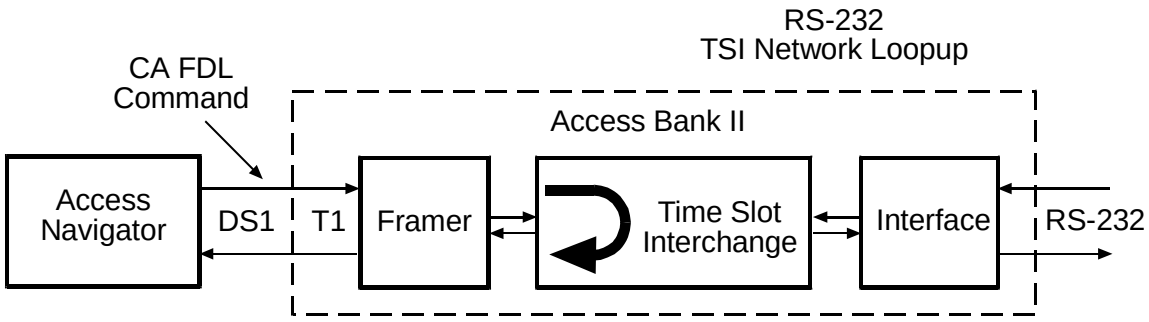

Figure 15-13. Remote RS-232 TSI Network Loopup

Send Remote SDSL Payload Loopup

This command makes the remote Access Bank II/SDSL perform a payload loopback on the SDSL data from both network and equipment sides. On the network side, this takes the received SDSL DS0s from the T1, loops it in the SDSL interface, and sends them back through the Time Slot Interchange (TSI) to the T1 output. On the equipment side, this takes the received data from the SDSL equipment, loops it in the SDSL interface, and sends it back to the SDSL output. See Figure 15-14.

Syntax: **`send remote`** *<n>* **`sdsl payload loopup`**

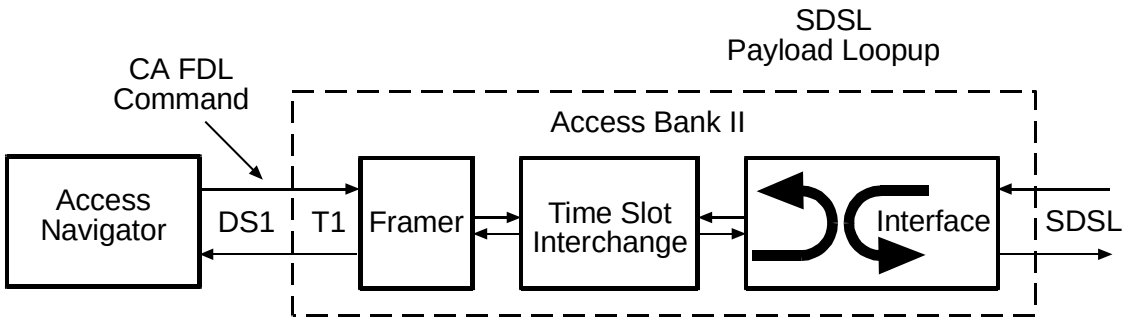

Figure 15-14. Remote SDSL Payload Loopup

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Send Remote T1 Payload Loopup

This command makes the remote Access Bank II perform a payload loopback. This takes the received DS0s from the T1, loops them in the framer, and sends them back to the T1 output. See Figure 15-15.

Payload loopbacks can be used with unframed PRBS and QRSS test patterns.

Syntax: **`send remote`** <*n*> **`t1 payload loopup`**

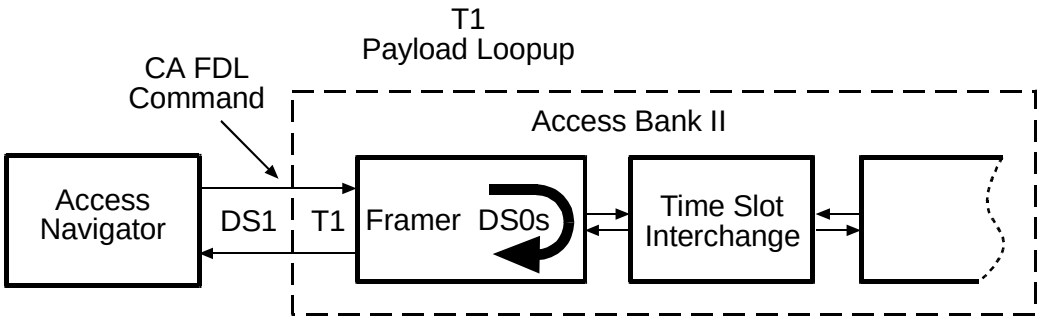

Figure 15-15. Remote T1 Payload Loopup

Send Remote T1 TSI Loopup

This command makes the remote Access Bank II perform a Time Slot Interchange (TSI) loopback. This takes the received DS0 data, loops it in the TSI, and sends it back to the T1 output. See Figure 15-17.

Syntax: **`send remote`** <*n*> **`t1 tsi loopup`**

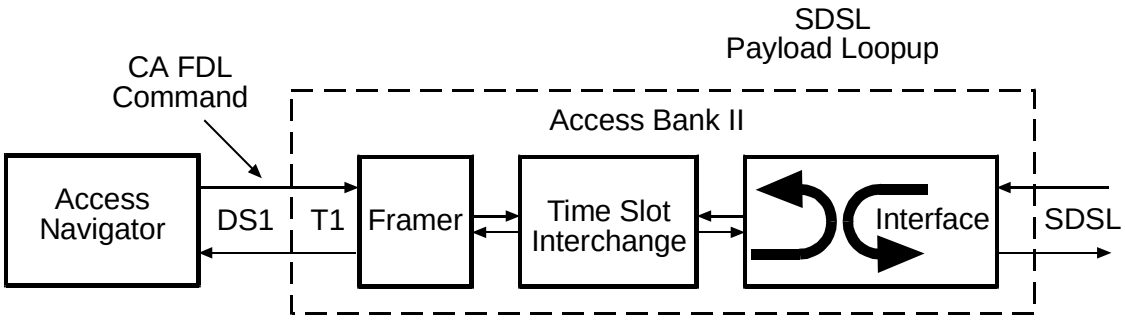

Figure 15-16. Remote SDSL Payload Loopup

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Send Remote T1 Drop Line Loopup

This command makes the remote Access Bank II perform a line loopback on the T1 Drop output. This takes the received T1 Drop DS1 signal, loops it in the framer, and sends it back to the T1 Drop output. See Figure 15-18.

Syntax: **`send remote`** *<n>* **`t1drop line loopup`**

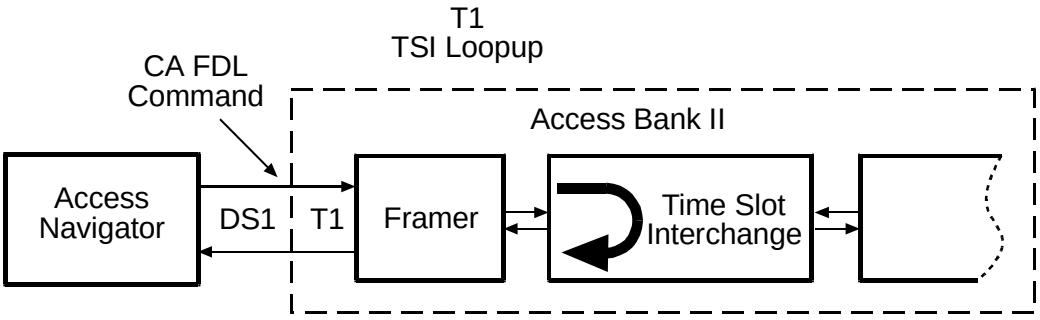

Figure 15-17. Remote T1 TSI Loopup

Send Remote T1 Drop Payload Loopup

This command makes the remote Access Bank II perform a payload loopback on the T1 Drop interface. This takes the received T1 Drop DS0s, loops them in the framer, and sends them back to the T1 Drop output. See Figure 15-19.

Syntax: **`send remote`** *<n>* **`t1drop payload loopup`**

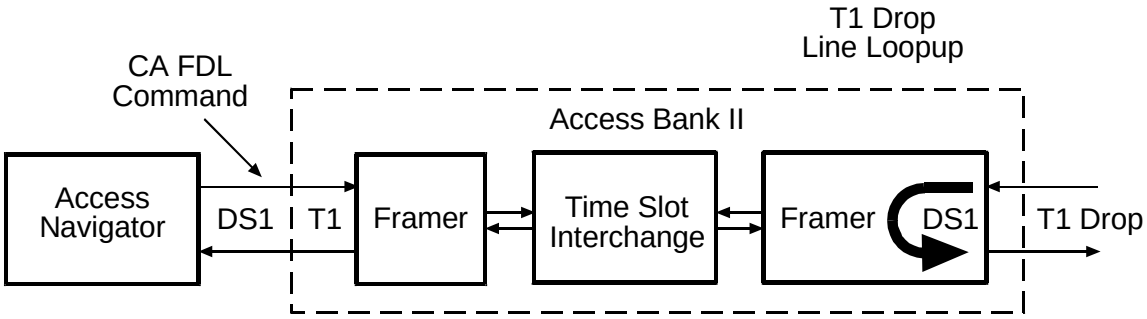

Figure 15-18. Remote T1drop Line Loopup

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Send Remote T1 Drop Payload Loopup

This command makes the remote Access Bank II perform a Time Slot Interface (TSI) loopback on the T1drop side. This takes the received T1drop DS0s, loops them in the TSI, and sends them back to the T1drop output. See Figure 15-19.

Syntax: **`send remote`** <*n*> **`t1drop tsi loopup`**

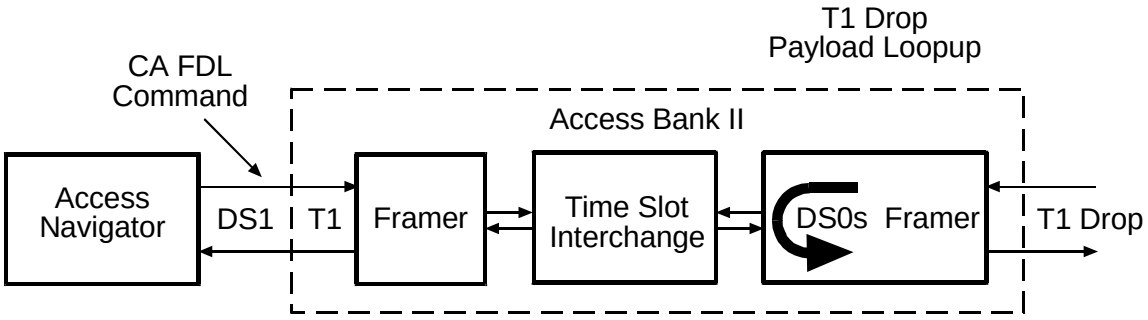

Figure 15-19. Remote T1 Drop Payload Loopup

Send Remote V35 Line Loopup

This command makes the remote Access Bank II perform a line loopback in the V.35 interface. This takes the received V.35 signal, loops it in theV.35 interface, and sends it back to the V.35 output. See Figure 15-20.

Syntax: **`send remote`** <*n*> **`v35 line loopup`**

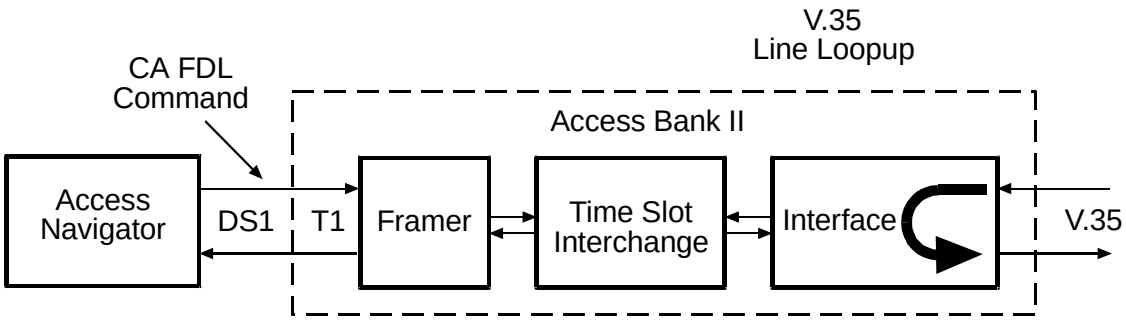

Figure 15-20. Remote V.35 Line Loopup

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Send Remote V35 TSI Equipment Loopup

This command makes the remote Access Bank II perform an equipment loopback on the V.35 signal. This takes the received DS0s from the V.35 equipment interface, loops them in the Time Slot Interchange (TSI), and sends them back to the V.35 output. See Figure 15-21.

Syntax: **`send remote`** *<n>* **`v35 tsi equipment loopup`**

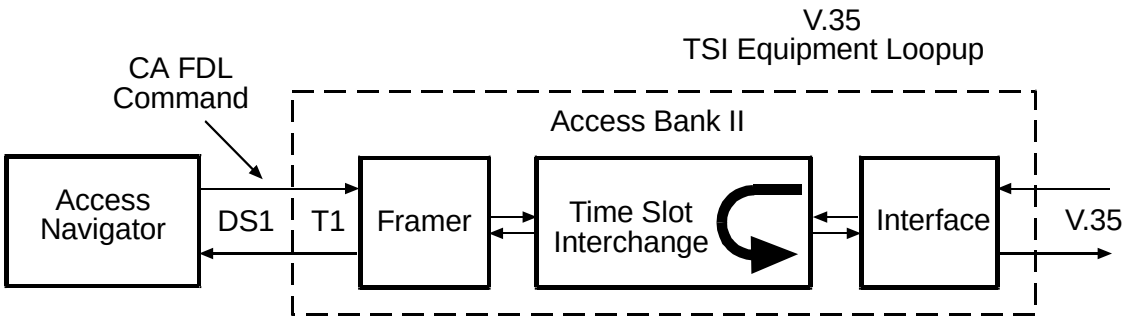

Figure 15-21. Remote V.35 TSI Equipment Loopup

Send Remote V35 TSI Network Loopup

This command makes the remote Access Bank II perform a network loopback on the V.35 data. This takes the received V.35 DS0s from the DS1, loops them in the Time Slot Interchange (TSI), and sends them back to the DS1 output. See Figure 15-22.

Syntax: **`send remote`** *<n>* **`v35 tsi network loopup`**

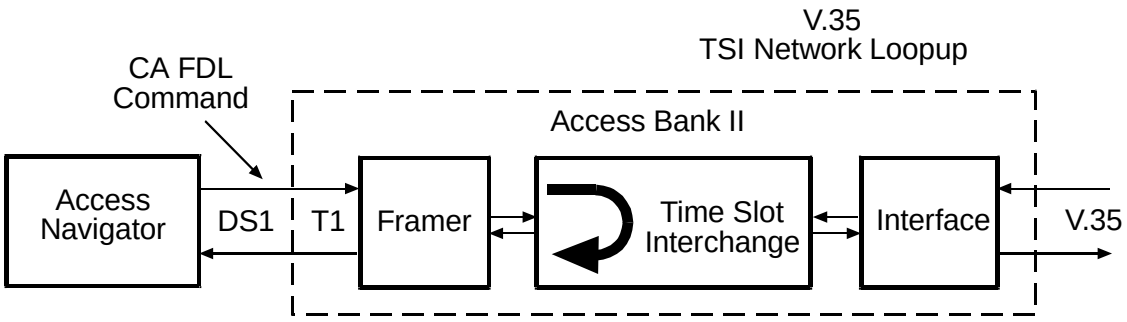

Figure 15-22. Remote V.35 TSI Network Loopup

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Bit Patterns and Error Tests

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Use the **`send ds1`** <*n*> **`off`** command to turn off loopbacks and patterns.

NOTE: Sending an unframed pattern will cause a DS1 Loss of Frame (LOF).

NOTE: Put the remote CSU or NIU in line loopback mode before using this command for BER testing. (See *DS1 CSU Loopup* and *DS1 Network Loopup*.)

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 15-13). Bit errors are also recorded in the BERT log (see *BERT Log* on page 15-7).

- Send DS1 (Pattern) Off ... 15-43
- Send DS1 Line Pattern ... 15-43
- Send DS1 Payload Pattern ... 15-44
- Send DS1 Line Pattern with BER Test ... 15-46
- Send DS1 Payload Pattern with BER Test ... 15-49

Send DS1 (Pattern) Off

This command stops (turns off) all **`qrss`** and **`prbs`** test patterns sent from the Access Navigator. The system default is off.

Syntax: **`send ds1`** <*n*> **`off`**

Send DS1 Line Pattern

This command transmits an unframed test pattern to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. The operator can select from several Pseudo Random Bit Sequence (PRBS) and Quasi Random Signal Source (QRSS) patterns.

When the operator commands the selected pattern, the Access Navigator generates and transmits the unframed pattern over the DS1. See Figure 15-23. Sending an unframed pattern will cause a DS1 Loss of Frame (LOF) on both the Access Navigator and the remote CSU.

An external Bit Error Rate Tester (BERT) can be located anywhere on the network or at the customer premises as shown in the figure.

When testing is complete, the **`send ds1 off`** command must be used to turn off the test pattern.

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NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: This command works with ESF and D4 (SF) framing.

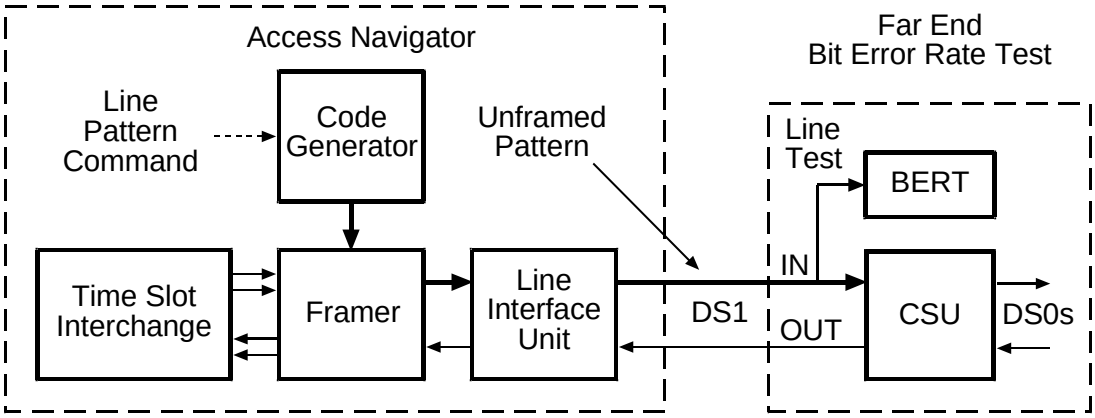

Figure 15-23. Send DS1 Line Pattern

Syntax: **`send ds1`** *<n>* **`line <p2e11|p2e15|p2e23|qrss>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Send DS1 Payload Pattern

This command transmits a framed test pattern to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. The operator can select from several pseudo-random test patterns, as well as all-ones, all-zeros, and 1-in-8.

When the operator commands the selected pattern, the Access Navigator generates and transmits the unframed pattern over the DS1 (see Figure 15-24).

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An external Bit Error Rate Tester (BERT) can be located anywhere on the network or at the customer premises as shown in the figure.

When testing is complete, the **`send ds1`** <*n*> **`off`** command must be used to turn off the test pattern.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: This command works with ESF and D4 (SF) framing.

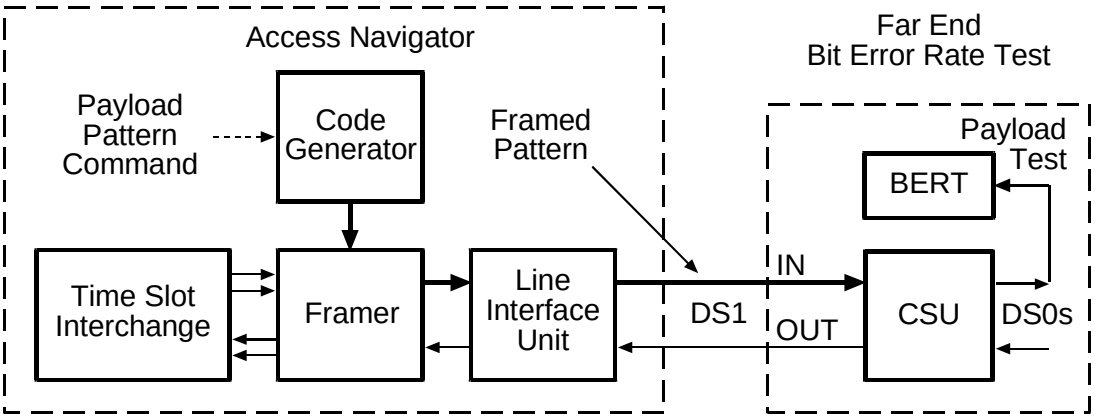

Figure 15-24. Send DS1 Payload Pattern

Syntax: **`send ds1`** <*n*> **`payload`**
`<allones|allzeros|f1in8|p2e11|p2e15|p2e23|qrss>`

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
allones	Send framed all-ones pattern. This can be used as a "keep alive" signal, idle code, and in measuring the T1 power level.
allzeros	Send framed all-zeros pattern. This can be used to test T1 circuits for B8ZS clear channel capability and to find equipment incorrectly set to AMI line code. Note: When using an all-zeros pattern, a T1 test set (such as a T-Berd 224 or Sunset T3) must be used to monitor for errors in the all-zeros pattern from the Access Navigator or looped back from a far-end network element.
f1in8	Send framed 1-in-8 pattern (also called a 1-and-7 pattern) in which each payload byte contains the bit pattern 01000000. (Minimal ones density test for T1 circuits with AMI coding.)
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)

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Field	Description
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Send DS1 Line Pattern with BER Test

This command transmits an unframed test pattern and performs a Bit Error Rate Test (BERT) to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II.

When the operator enters the test command, the Access Navigator generates and transmits the selected test pattern while using its internal Bit Error Rate Tester to measure the bit error rate (see Figure 15-25). Sending an unframed pattern will cause a DS1 Loss of Frame (LOF) on both the Access Navigator and the remote CSU for the duration of the test.

After 10 seconds the pattern is turned off and the test results from the BERT are displayed in a CLI message. (The **`send ds1`** <*n*> **`off`** command is not required to turn off the pattern.)

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Sending an unframed pattern will cause a DS1 Loss of Frame (LOF).

NOTE: Put the remote CSU or NIU in line loopback mode before using this command for BER testing. (See *DS1 CSU Loopup* and *DS1 Network Loopup*.)

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 15-13). Bit errors are also recorded in the BERT log (see *BERT Log* on page 15-7).

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

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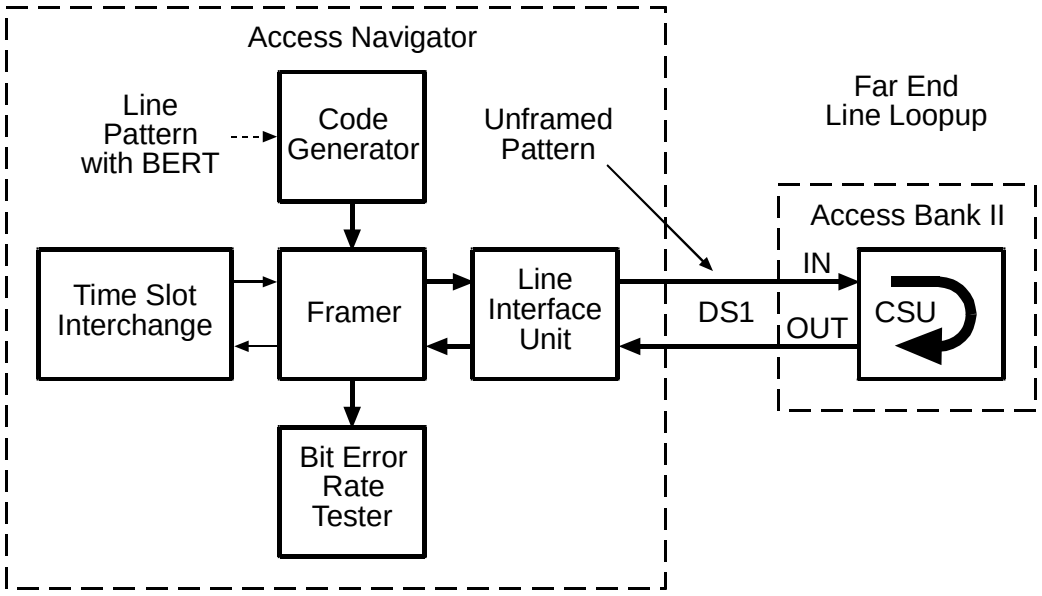

Figure 15-25. Send DS1 Line Pattern with BER Test

Syntax: **`send ds1 <n> line <p2e11|p2e15|p2e23|qrss> test`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`set ds1 9 line p2e15 test`**

The CLI will provide a progress message indicating the success (ok) or failure of the command, as in the following samples.

Message:
```
Waiting for pattern sync........ok.
   Testing line...
    08:15:47   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:48   FBE:0      BE:0       CRC:0      BPV/LCV:0
```


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```
 08:15:49   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:50   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:51   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:52   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:53   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:54   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:55   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:56   FBE:0      BE:0       CRC:0      BPV/LCV:0
            Totals       Error Rates
FBE:        0            0.000000e+00
BE:         0            0.000000e+00
CRC:        0            0.000000e+00
LCV/BPV:    0            0.000000e+00

Signaling done.
```

The following error message will occur if an incorrect pattern is received:

Message: `Waiting for pattern sync.........no sync.`

The following error message will occur if there is no loopback in effect:

Message:
```
*-Unable to send code;
*- far-end is not in loopback.
```

Description:

Item	Description
Time	Time is recorded in one-second intervals. Format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.
FBE	Number of Frame Bit Errors (4095 maximum) in one-second interval.
BE	Number of Bit Errors (4095 maximum) in one-second interval
CRC	Number of Cyclical Redundancy Check errors (1023 maximum) in one-second interval
BPV/LCV	Number of Bi-Polar Violations and Line Code Violations (16,383 maximum) in one-second interval
Totals	Total number of errors for 10-second test interval
Error Rates	Total error rates measured during the 10-second test interval, expressed in scientific notation where "e" indicates a power of 10. For example, 1 error per 1.544 megabits is 6.520000e-07. The maximum value is 2.700000e-03.

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Send DS1 Payload Pattern with BER Test

This command transmits a framed test pattern and performs a Bit Error Rate Test (BERT) or pattern synchronization test to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. When the operator requests a p2e, qrss, or all-ones test pattern, the Access Navigator transmits the test pattern while using its internal Bit Error Rate Tester to measure the bit error rate. See Figure 15-26. For the all-zeros and 1-in-8 patterns, the Access Navigator tests for pattern synchronization.

After 10 seconds the pattern is turned off and the test results from the BERT or pattern sync are displayed in a CLI message. (The **`send ds1`** <*n*> **`off`** command is not required to turn off the pattern.)

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Put the remote CSU in payload loopback mode before using this command for BER testing. (See *DS1 CSU Loopup* on page 15-31.)

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 15-13). Bit errors are also recorded in the BERT log (see “BERT Log” on page 7).

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

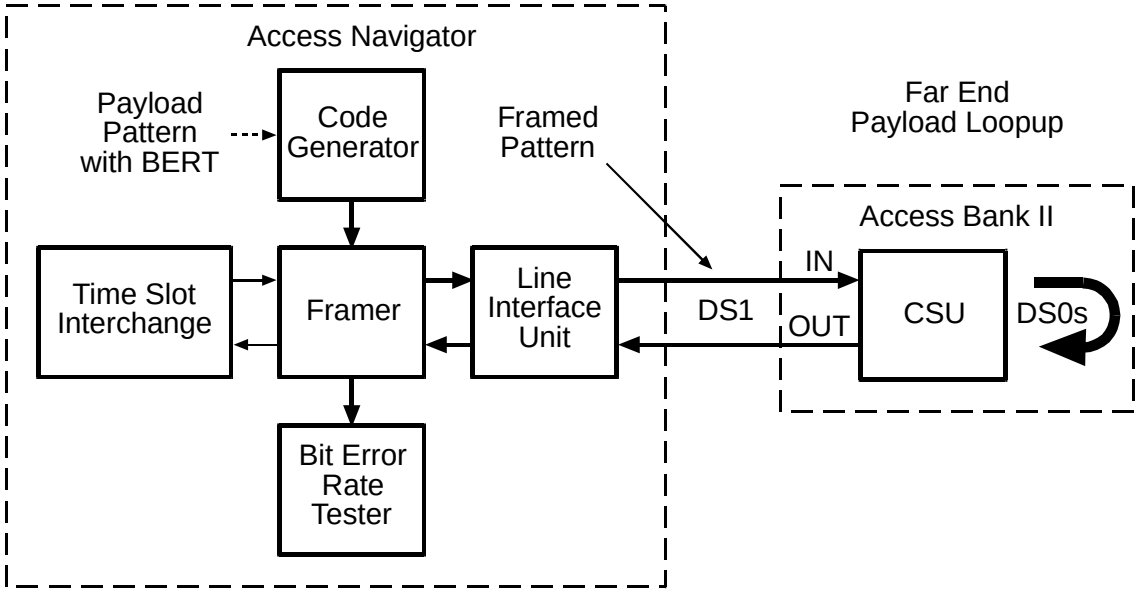

Figure 15-26. Send DS1 Payload Pattern with BER Test

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Syntax: **`send ds1 <n> payload <allones|allzeros|f1in8|p2e11|p2e15|p2e23|qrss> test`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
allones	Send framed all-ones pattern. This can be used as a "keep alive" signal, idle code, and in measuring the T1 power level.
allzeros	Send framed all-zeros pattern. This can be used to test T1 circuits for B8ZS clear channel capability and to find equipment incorrectly set to AMI line code. Note: When using an all-zeros pattern, a T1 test set (such as a T-Berd 224 or Sunset T3) must be used to monitor for errors in the all-zeros pattern from the Access Navigator or looped back from a far-end network element.
f1in8	Send framed 1-in-8 pattern (also called a 1-and-7 pattern) in which each payload byte contains the bit pattern 01000000. (Minimal ones density test for T1 circuits with AMI coding.) **Note**: You must wait 30 seconds after the prompt appears before doing another test.
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`send ds1 9 payload p2e15 test`**

For most patterns, the CLI will provide a progress message indicating the success (ok) or failure of the command followed by the test results, as in the following samples.

Message:

```
Waiting for pattern sync........ok.
   Testing line...
    08:15:47   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:48   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:49   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:50   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:51   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:52   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:54   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:55   FBE:0      BE:0       CRC:0      BPV/LCV:0
```


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```
 08:15:56   FBE:0      BE:0       CRC:0      BPV/LCV:0
 08:15:57   FBE:0      BE:0       CRC:0      BPV/LCV:0

           Totals        Error Rates
FBE:       0              0.000000e+00
BE:        0              0.000000e+00
CRC:       0              0.000000e+00
LCV/BPV:   0              0.000000e+00

Signaling done.
```

The following error message will occur if an incorrect pattern is received:

Message: `Waiting for pattern sync.........no sync.`

Example: **`send ds1 9 payload f1in8 test`**

For the 1-in-8 and all-zeros patterns, the CLI will provide a progress message indicating the success (ok) or failure of the command, followed by a pattern detection message for each second of the test.

Message:

```
Waiting for pattern sync........ok.
   Testing line...
    08:18:23   Pattern Not Present
    08:18:24   Pattern Present
    08:18:25   Pattern Present
    08:18:26   Pattern Present
    08:18:27   Pattern Present
    08:18:28   Pattern Present
    08:18:29   Pattern Present
    08:18:30   Pattern Present
    08:18:31   Pattern Present
    08:18:32   Pattern Present

   Signaling done.
```


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Description:

Item	Description
Time	Time is recorded in one-second intervals. Format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.
FBE	Number of Frame Bit Errors (4095 maximum) in one-second interval
BE	Number of Bit Errors (4095 maximum) in one-second interval
CRC	Number of Cyclical Redundancy Check errors (1023 maximum) in one-second interval
BPV/LCV	Number of Bi-Polar Violations and Line Code Violations (16,383 maximum) in one-second interval
Totals	Total number of errors for 10-second test interval
Error Rates	Total error rates measured during the 10-second test interval, expressed in scientific notation where "e" indicates a power of 10. For example, 1 error per 1.544 megabits is 6.520000e-07. The maximum value is 2.700000e-03.

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Other Maintenance Commands

CLI Commands	Descriptions
set autoexit <*minutes*>	When enabled, the CLI session will automatically expire if there is no user activity during the specified time period.
ping <*ipaddr*>	Uses "Ping" (an Internet tool) to verify network connections and reachability. See *Ping* on page 18-45.
reset all	Produces a soft reset of both Controller cards. See *Reset All* on page 18-57.
reset ds1 <*n*>	Enables the operator to reset one or more DS1 framers to test Loss of Frame recovery. *Reset DS1 Framer* on page 18-57.
reset remote <*n*>	Resets a remote Access Bank II connected to the Access Navigator through a DS1. *Reset Remote* on page 18-58.
reset standby	Produces a soft reset of the standby Controller card to verify operational status. *Reset Standby* on page 18-58.
restore defaults	Replaces the settings stored in the Controller card's flash memory with the factory default values. *Restore Defaults* on page 18-59.
switch controller	Transfers active control to the standby Controller card. *Switch Controller* on page 18-176.
upload tftp config <*ipaddr*> <*"file"*> <*blocksize*>	Reads the Access Navigator configuration database from flash memory and saves the settings in file format. See *Upload TFTP Config* on page 18-176.

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CLI Commands	Descriptions
load tftp config *<ipaddr> <"file"> <blocksize>*	Downloads a file containing configuration database settings into the Access Navigator. See *Load TFTP Config* on page 18-37.
show users	Shows current users and status.
whoami	Shows the name and access level of the user who is logged into the Access Navigator from the current management terminal.

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Technical Support

Carrier Access Customer Support is available 24 hours a day, 7 days a week at (800) 786-9929 or (303) 442-5455 and via email at tech-support@carrieraccess.com.

Before contacting Customer Support, please capture the following information from the Access Navigator having problems and e-mail them to us. This information will make it much easier for us to diagnose and troubleshoot your problem.

Start a management session and configure the terminal or Telnet program to capture or log the screen text. Then enter the following commands:

`show time`
`show date`
`status equipment`
`show ds1 all`
`status clock`
`status remote all`
`status tmc`
`status tmc all`
`status eoc`
`show switch`
`show ip`
`show snmp`
`show isdn database`
`alarms`
`log`
`dbg log`
`log tmc`
`log config`
`show ds1 25` (or whichever switch DS1 is the primary)
`show ds1 29` (or whichever switch DS1 is the secondary)
`status ds1 25` (or whichever switch DS1 is the primary)
`status ds1 29` (or whichever switch DS1 is the secondary)
`status ds1 25 performance` (or whichever switch DS1 is the primary)
`status ds1 29 performance` (or which ever switch DS1 is the secondary)

If you are setting up 4:1 BRI service with the Access Navigator, enter the following commands:

`status isdn crv 1-24` (or whichever CRVs are being used)
`show ds0 1:1-24` (or whichever DS1s and DS0s are being used for ISDN)
`show connect 1` (or whichever DS1s are being used for ISDN)
`show isdn database`
`show crv database`

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If your having dial tone problems, enter the following commands:

`trace tmc on` (let run for 2 or 3 minutes)
`trace tmc off`

`trace eoc on` (let run for 2 or 3 minutes)
`trace eoc off`

`show ds1` (for any problem DS1s)

`status ds1` (for any problem DS1s)

After entering the above commands, turn off capture or logging to close the file.

Attach the capture or log file to your email. Please include a phone number where you can be reached, and the best time to call you. Also include a description of your problem and anything else you think might be needed or helpful.

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CHAPTER 16

Maintenance Procedures

In this Chapter

- Compliance and Safety Requirements ... 16-2
- Repair and Return Procedure ... 16-2
- Replace Controller Card ... 16-3
- Replace Quad T1 Framer Card ... 16-19
- Install SIMM on Controller Card ... 16-28

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Compliance and Safety Requirements

DANGER! **FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.**

CAUTION! **NEBS 1089 EMI/EMC AND FCC REQUIREMENT PART 15 COMPLIANCE REQUIRES CHASSIS GROUNDING, SHIELDED DSX-1 AND RS-232 CABLES WITH FERRITE RF SUPPRESSOR BEADS, AND SHIELDED ETHERNET AND BITS CLOCK CABLES TO PREVENT RADIO FREQUENCY INTERFERENCE WITH OTHER EQUIPMENT.**

WARNING! **NEBS REQUIREMENT. DO NOT CONNECT THIS EQUIPMENT DIRECTLY TO METALLIC TIP-AND-RING OUTSIDE PLANT CONDUCTORS. THIS EQUIPMENT CAN ONLY BE USED FOR INTRA-BUILDING (INSIDE PLANT) INSTALLATION IN A CENTRAL OFFICE OR CUSTOMER PREMISES.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

Repair and Return Procedure

See *Warranty* and *Warranty Product Returns* in the Preface of this manual.

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Replace Controller Card

Procedure Summary

- Overview ... 16-3
- Precautions ... 16-4
- Tools and Materials Required ... 16-4
- Verify Equipment Status ... 16-5
- Determine Which Replacement Procedure to Use ... 16-5
- Replace Protected Controller Card ... 16-6
- Replace Unprotected Controller Card ... 16-13

Overview

This procedure applies to an Access Navigator with one or two Controller cards. The Access Navigator can hold two (redundant) Controller cards for time-slot interchange. In a redundant system, the standby Controller can be replaced without disrupting service. Then, by using a CLI command to switch the active Controller to standby, the other Controller can be replaced. In an Access Navigator with only one Controller card, the Controller can be replaced without disrupting service if the new Controller is installed before removing the old Controller.

Incompatible Software – This procedure contains Cautions to prevent accidental installation of Controller cards with incompatible software, which could disrupt service and alter provisioning settings. These cautions can be ignored if the final installation provides two Controller cards with identical or compatible software.

Alarm and Log Events – During the replacement process, if two Controller cards are installed with incompatible software, the Access Navigator will produce a minor alarm and the event log will contain an entry stating that one of the Controllers is Incompatible. This message is normal and can be ignored if the final installation provides two Controller cards with identical or compatible software.

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Precautions

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

CAUTION! **SERVICE DISRUPTIONS WILL OCCUR IF THE ACTIVE CONTROLLER CARD IS REMOVED WITHOUT AN OPERATIONAL STANDBY CONTROLLER. TO AVOID SERVICE DISRUPTIONS, ALWAYS REPLACE THE STANDBY CONTROLLER FIRST. IN A PROTECTED SYSTEM WITH TWO CONTROLLER CARDS, THE ACTIVE CONTROLLER SHOULD BE SWITCHED TO STANDBY MODE BEFORE REMOVING. IN AN UNPROTECTED SYSTEM WITH ONLY ONE CONTROLLER CARD, THE NEW CONTROLLER SHOULD BE INSTALLED AND SWITCHED TO ACTIVE MODE BEFORE REMOVING THE OLD CONTROLLER.**

SERVICE DISRUPTIONS MAY OCCUR IF TWO CONTROLLER CARDS ARE INSTALLED WITH INCOMPATIBLE SOFTWARE, SUCH AS ONE DCS CARD AND ONE GR-303 CARD. NO DISRUPTIONS WILL OCCUR UNTIL THE INCOMPATIBLE CARD IS SWITCHED INTO THE ACTIVE MODE, ALLOWING TIME TO SAFELY REMOVE THE INCOMPATIBLE CARD. IF YOU WISH TO INSTALL A CONTROLLER THAT IS NOT COMPATIBLE, VERIFY PROVISIONING WITH OFFICE RECORDS, BOTH BEFORE AND AFTER INSTALLATION, TO ENSURE THAT NO CIRCUITS HAVE BEEN ALTERED.

Tools and Materials Required

1. Obtain the following tools and materials.
   - Office records for installation site
   - Screwdrivers, slotted
   - Grounding wrist strap
   - Controller card
   - User name and password (if required)
2. Unpack and inspect Controller card for damage.
   - Do not remove circuit cards from anti-static wrappers without following proper anti-static procedures.
   - Verify that equipment to be installed agrees with office records.

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Verify Equipment Status

1. Start management session, if not already logged on.
2. Display equipment status.

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment       Status            Version
---------       ------            -------
Controller A    Active             1.70
Controller B    Standby            1.70
DS1 Card 1      Installed          1
DS1 Card 2      Installed          1
DS1 Card 3      Installed          1
DS1 Card 4      Installed          1
DS1 Card 5      Installed          1
DS1 Card 6      Installed          1
DS1 Card 7      Card not installed
DS1 Card 8      Card not installed
```

NOTE: In a system with two Controller cards, one Controller will have “Active” status and the other will have “Standby” status. A defective Controller card will have an “Unknown” status, indicating that the card is installed but not responding.

Determine Which Replacement Procedure to Use

3. Observe status of Controller A and Controller B.
4. If both Controllers are “Installed,” go to *Replace Protected Controller Card* on page 16-6.
5. If one Controller is “Not Installed,” go to *Replace Unprotected Controller Card* on page 16-13.
6. If one Controller is “Unknown,” it is assumed that the Controller is defective. Go to *Replace Unprotected Controller Card* on page 16-13.
7. If no status display appears, go to *Replace Unprotected Controller Card* on page 16-13.

NOTE: No status display can result from a loss of power or loss of management connection. If power and connections are okay, then one or both controllers may be defective, indicating that all provisioning data has been lost and must be re-entered or restored from a backup file.

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Replace Protected Controller Card

Procedure Summary

- Precautions ... 16-6
- Verify Compatibility ... 16-7
- Remove Front Cover ... 16-8
- Replace Standby Controller ... 16-9
- Verify Operation and Compatibility ... 16-11
- Replace Other Controller Card ... 16-12
- Replace Front Cover ... 16-12

Precautions

CAUTION! **THIS PROCEDURE APPLIES ONLY TO ACCESS NAVIGATORS WITH PROTECTED (REDUNDANT) CONTROLLER CARDS. DO NOT USE THIS PROCEDURE FOR UNPROTECTED SYSTEMS WITH ONLY ONE CONTROLLER CARD.**

NOTE: This procedure provides steps for replacing one or both Controller cards by physically removing the old card and installing a new card. In a redundant system, the standby Controller card can be replaced without disrupting service. The new Controller must be given two minutes to reboot and copy system settings from the old card. Then a CLI command is used to switch the standby Controller to active mode, so the other card (now in standby) can also be replaced.

NOTE: **Alarm and Log Events** – During the replacement process, if two Controller cards are installed with incompatible software, the Access Navigator will produce a minor alarm and the event log will contain an entry stating that one of the Controllers is Incompatible. This message is normal and can be ignored if the final installation provides two Controller cards with identical or compatible software.

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Verify Compatibility

1. Display current Controller status and software version by entering the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status             Version
---------        ------             -------
Controller A     Active              1.70
Controller B     Standby             1.70
DS1 Card 1       Installed           1
DS1 Card 2       Installed           1
DS1 Card 3       Installed           1
DS1 Card 4       Installed           1
DS1 Card 5       Installed           1
DS1 Card 6       Installed           1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

NOTE: In a system with two Controller cards, one Controller will have “Active” status and the other will have “Standby” status. A defective Controller card will have an “Unknown” status, indicating that the card is installed but not responding.

2. If new Controller card version is compatible with installed active Controller card, skip remaining steps.
3. If new Controller card version is NOT compatible with installed active Controller card, continue this procedure only if prepared for a service interruption and loss of provisioning. Verify provisioning both before and after performing this procedure. Make provisioning changes as required to re-establish service.

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Remove Front Cover

WARNING! THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.

1. Put on grounding wrist strap and follow anti-static procedures.

DANGER! BURN HAZARD. CHASSIS, COVER SCREWS, AND CONTROLLER CARD HEAT SINK MAY BE HOT TO THE TOUCH.

2. Loosen captive thumbscrews on front cover (see Figure 16-1).

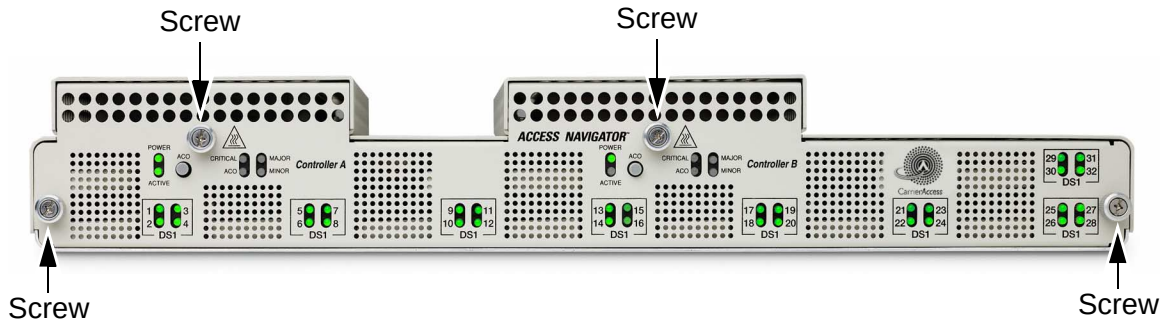

Figure 16-1. Location of Front Panel Cover Screws

3. Remove front cover and set aside.

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Replace Standby Controller

CAUTION! DO NOT REMOVE THE ACTIVE CONTROLLER CARD.

1. Locate standby Controller card slot (see Figure 16-2).

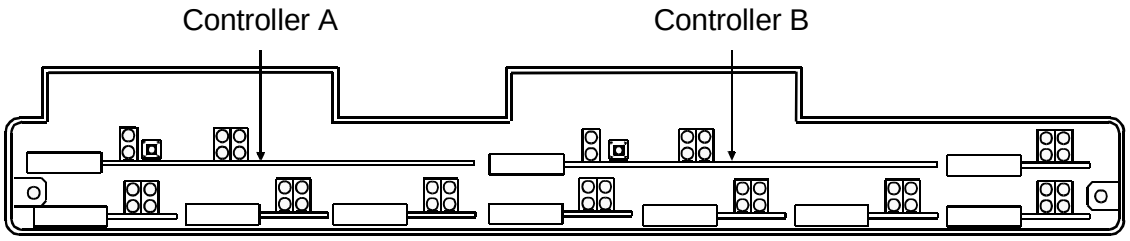

Figure 16-2. Location of Controller Cards

2. Visually verify which Controller card (A or B) is active (see Figure 16-3). The LED indicators on the active Controller should be as follows:
   - Active CONTROLLER POWER indicator lights green.
   - Active CONTROLLER ACTIVE/STANDBY indicator lights green.

.

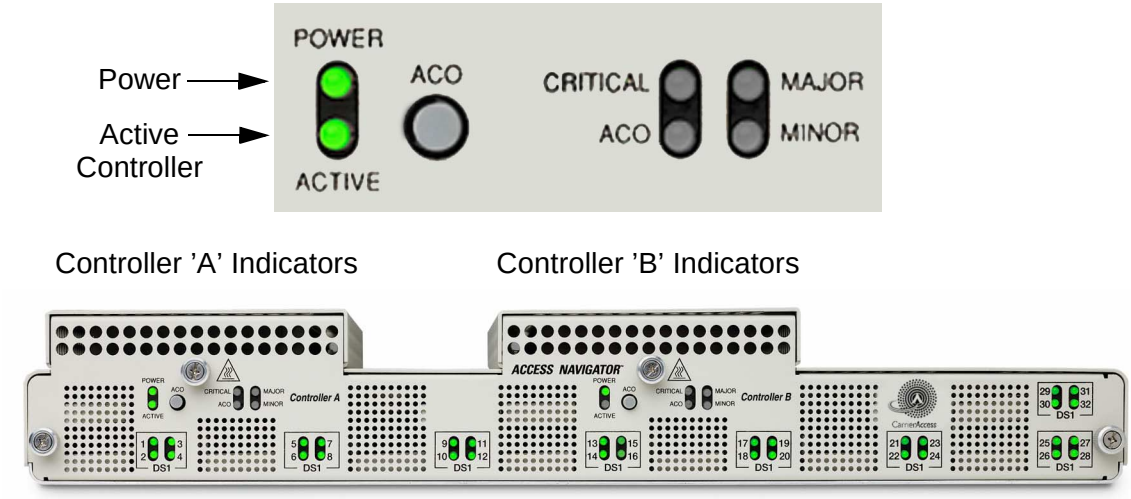

Figure 16-3. Location of Front Panel Controller Status LEDs

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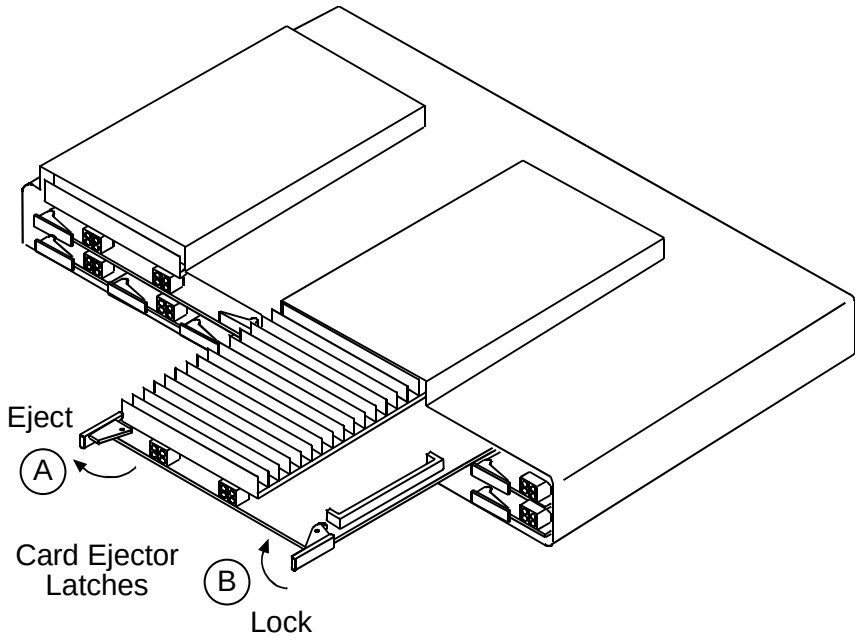

Figure 16-4. Installing and Removing Controller Card

NOTE: The example in Figure 16-4 shows installation and removal of Controller B.

3. Press standby Controller card ejector latches toward outside of card until card connector releases from backplane connector (see A in Figure 16-4).
4. Slide old standby Controller out of card slot and set aside for return to repair facility.
5. Remove new Controller card from anti-static bag.
6. Straighten card ejector latches (see A in Figure 16-4), position new Controller card in guide rails, and carefully slide into old Controller card slot.
7. Press card ejector latches in toward center of card (see B in Figure 16-4) until card connector mates with backplane connector.

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Verify Operation and Compatibility

1. Verify power-on status of new Controller card. The LED indicators should be as follows:

NOTE: Controller's POWER indicator will light yellow while it is booting up.

Requirement: New CONTROLLER POWER indicator lights green.

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

2. Wait two minutes for new Controller card to learn system settings.
3. Verify Controller card status by entering the following command:

```
status equipment
```

Requirement: New Controller card status is "Standby".

Requirement: New Controller card has compatible software version.

4. If new Controller card version is compatible with installed active Controller card, skip remaining steps.
5. If new Controller card version is NOT compatible with installed active Controller card, continue only if prepared for a service interruption and loss of provisioning. Verify provisioning both before and after performing this procedure. Make provisioning changes as required to re-establish service

CAUTION! IF NEW CONTROLLER HAS INCOMPATIBLE SOFTWARE, YOU CAN STILL REMOVE IT SAFELY AT THIS TIME. SWITCHING IT TO ACTIVE MODE WILL DISRUPT SERVICE AND ALTER PROVISIONING.

6. Put new Controller card into active mode by entering following command:

```
switch controller
```

7. Verify operational status of new Controller by entering the following command:

```
status equipment
```

Requirement: New Controller card status is "Active".

8. Verify active status of new Controller card. The LED indicators should be as follows:

Requirement: New CONTROLLER ACTIVE/STANDBY indicator lights green.

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Replace Other Controller Card

1. To replace other Controller card, repeat this procedure by going back to *Replace Standby Controller* on page 16-9.

NOTE: Event Log – During this procedure, the two Controller cards may momentarily be operating with different software versions. If the software features are incompatible, the Access Navigator event log will contain an entry stating that one of the Controllers is Incompatible. This message is normal and can be ignored if both Controllers have the same software.

2. Verify Controller card status by entering the following command:

   ```
   status equipment
   ```

   Requirement: Both Controller cards show same software version.

3. End management session by entering following command:

   ```
   exit
   ```

Replace Front Cover

DANGER! FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.

Replace front cover and tighten screws.

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Replace Unprotected Controller Card

Procedure Summary

- Precautions ... 16-13
- Verify Compatibility ... 16-14
- Remove Front Cover ... 16-15
- Insert New Controller ... 16-16
- Verify Operation and Compatibility ... 16-17
- Remove Old Controller ... 16-18
- Replace Front Cover ... 16-18

Precautions

CAUTION! **THIS PROCEDURE APPLIES ONLY TO ACCESS NAVIGATORS WITH ONE UNPROTECTED CONTROLLER CARD. DO NOT USE THIS PROCEDURE FOR PROTECTED SYSTEMS WITH TWO (REDUNDANT) CONTROLLER CARDS.**

TO AVOID SERVICE DISRUPTIONS, DO NOT REMOVE THE ACTIVE CONTROLLER CARD. IF POSSIBLE, INSERT A NEW CONTROLLER CARD AND PUT OLD CONTROLLER CARD IN STANDBY MODE BEFORE REMOVING.

NOTE: This procedure provides steps for replacing a Controller card by installing a new Controller card and then removing the old Controller card. Because the Access Navigator has two card slots for holding Controller cards, a Controller card be replaced without disrupting service. First, the new Controller card is inserted into the empty card slot. The new Controller is given two minutes to reboot and copy system settings from the old card. Then a CLI command is used to switch the old Controller to standby so it can be removed.

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Verify Compatibility

1. Display current Controller status and software version by entering the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status             Version
---------        ------             -------
Controller A     Card not installed
Controller B     Active              1.70
DS1 Card 1       Installed           1
DS1 Card 2       Installed           1
DS1 Card 3       Installed           1
DS1 Card 4       Installed           1
DS1 Card 5       Installed           1
DS1 Card 6       Installed           1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

NOTE: In an unprotected system with only one Controller card, the Controller will have "Active" status and the other Controller card slot status will show "Card not installed".

2. If new Controller card version is compatible with installed active Controller card, skip remaining steps.
3. If new Controller card version is NOT compatible with installed active Controller card, continue this procedure only if prepared for a service interruption and loss of provisioning. Verify provisioning both before and after performing this procedure. Make provisioning changes as required to re-establish service.

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Remove Front Cover

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

1. Put on grounding wrist strap and follow anti-static procedures.

DANGER! **BURN HAZARD. CHASSIS, COVER SCREWS, AND CONTROLLER CARD HEAT SINK MAY BE HOT TO THE TOUCH.**

2. Loosen captive thumbscrews on front cover (see Figure 16-1).

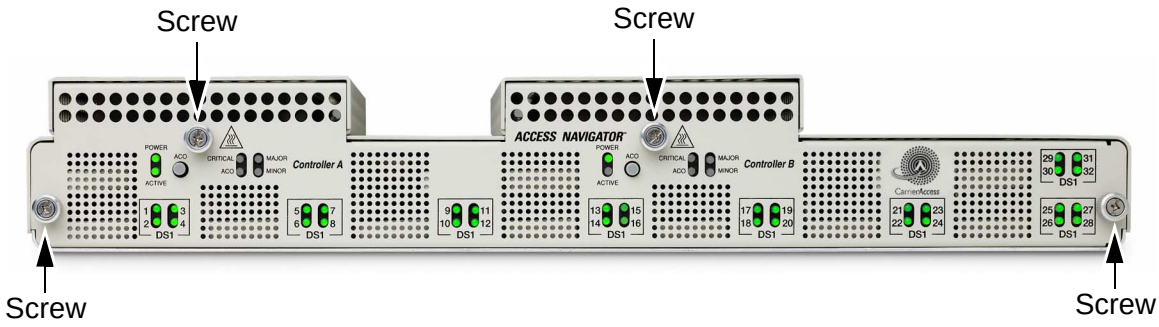

Figure 16-5. Location of Front Panel Cover Screws

3. Remove front cover and set aside.

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Insert New Controller

1. Locate empty Controller card slot (see Figure 16-6).

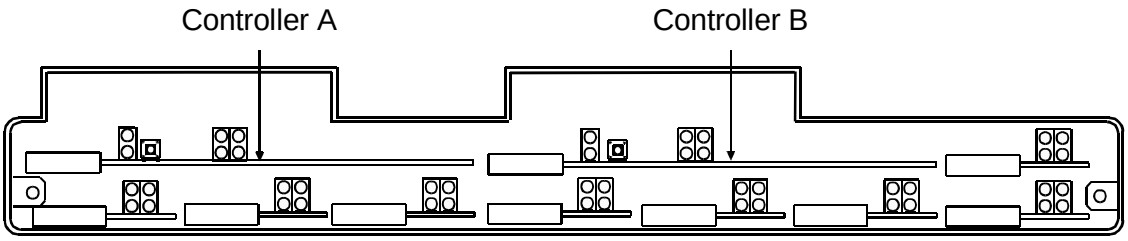

Figure 16-6. Location of Controller Cards

2. Remove new Controller card from anti-static bag.

NOTE: The example in Figure 16-7 shows installation and removal of Controller B.

3. Straighten card ejector latches (see A in Figure 16-7), position new Controller card in guide rails, and carefully slide into empty card slot.
4. Press card ejector latches in toward center of card (see B in Figure 16-7) until card connector mates with backplane connector.

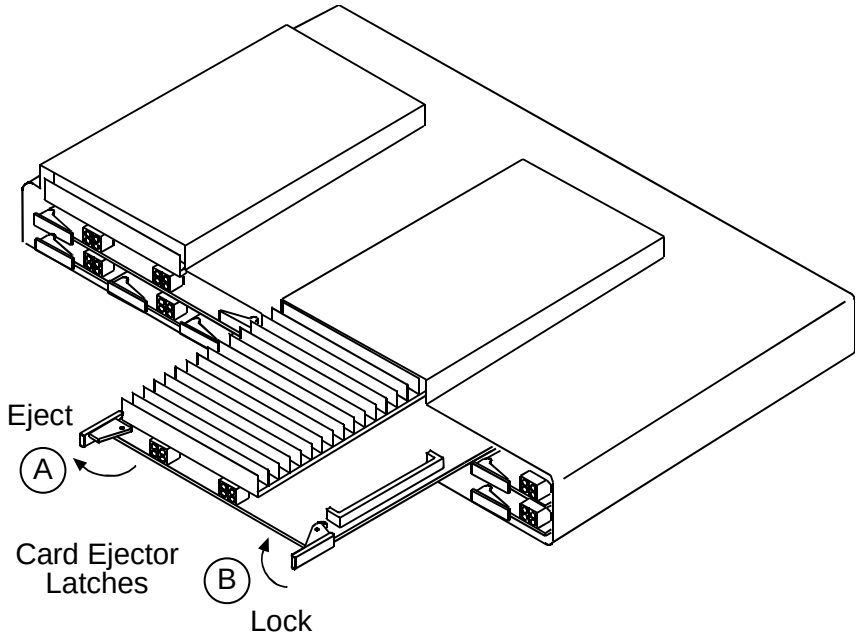

Figure 16-7. Installing and Removing Controller Card

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Verify Operation and Compatibility

1. Wait two minutes for new Controller card to boot up and learn system settings.
2. Verify power-on status of new Controller card. The LED indicators should be as follows:

NOTE: Controller's POWER indicator will light yellow while it is booting up.

Requirement: New CONTROLLER POWER indicator lights green.

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

3. Verify Controller card status by entering the following command:

```
status equipment
```

Requirement: New Controller card status is "Standby".

Requirement: New Controller card has compatible software version.

4. If new Controller card version is compatible with installed active Controller card, skip remaining steps.
5. If new Controller card version is NOT compatible with installed active Controller card, continue only if prepared for a service interruption and loss of provisioning. Verify provisioning both before and after performing this procedure. Make provisioning changes as required to re-establish service

CAUTION! IF NEW CONTROLLER HAS INCOMPATIBLE SOFTWARE, YOU CAN STILL REMOVE IT SAFELY AT THIS TIME. SWITCHING AN INCOMPATIBLE CARD TO ACTIVE MODE MAY DISRUPT SERVICE OR ALTER PROVISIONING.

6. Put new Controller card into active mode by entering following command:

```
switch controller
```

7. Verify active status of new Controller card. The LED indicators (see Figure 16-8) should be as follows:

Requirement: New CONTROLLER ACTIVE/STANDBY indicator lights green.

8. Verify operational status of new Controller by entering the following command:

```
status equipment
```

Requirement: New Controller card status is "Active".

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.

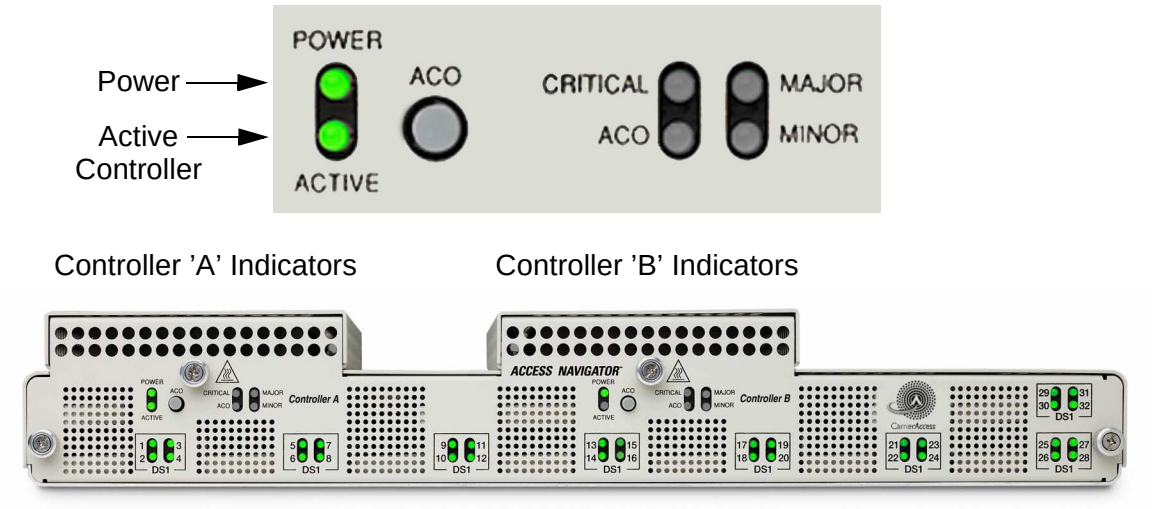

Figure 16-8. Location of Front Panel Controller Status LEDs

Remove Old Controller

1. On old standby Controller card, press ejector latches in toward outside of card until card connector releases with backplane connector (see Figure 16-7).
2. Slide old standby Controller out of card slot and set aside for return to repair facility.
3. End management session by entering following command:

   ```
   exit
   ```

Replace Front Cover

DANGER! FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.

Replace front cover and tighten screws.

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Replace Quad T1 Framer Card

Procedure Summary

- Overview ... 16-3
- Precautions ... 16-4
- Tools and Materials Required ... 16-4
- Verify Equipment Status ... 16-5
- Determine Which Replacement Procedure to Use ... 16-5
- Replace Protected Controller Card ... 16-6
- Replace Unprotected Controller Card ... 16-13

Overview

This procedure provides steps for replacing a Quad T1 Framer (QF) card. The Access Navigator can hold up to eight QF cards, providing a total of 32 DS1 circuits. QF cards are hot-swappable and can be installed at any time, without interrupting service on other cards, except when the card is providing a DS1 clock source used for system timing.

Each Quad T1 Framer card contains four DS1 circuits. DS1 circuit numbers are determined by the QF card slot (see also Figure 16-10):

QF Card Slot	DS1 Circuit Numbers			
#1	1	2	3	4
#2	5	6	7	8
#3	9	10	11	12
#4	13	14	15	16
#5	17	18	19	20
#6	21	22	23	24
#7	25	26	27	28
#8	29	30	31	32

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Precautions

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

CAUTION! **REMOVING A QUAD T1 FRAMER CARD WILL DISRUPT SERVICE ON ALL FOUR OF THE DS1 CIRCUITS CARRIED BY THE CARD.**

DO NOT REMOVE A QUAD T1 FRAMER CARD IF A DS1 RECEIVER IS PROVIDING A CLOCK SOURCE USED FOR SYSTEM TIMING. BEFORE REMOVING THE CARD, TEMPORARILY ASSIGN A DS1 ON A DIFFERENT CARD TO PROVIDE THE CLOCK SOURCE.

Tools and Materials Required

1. Obtain the following tools and materials.
   - Office records for installation site
   - Screwdrivers, slotted
   - Grounding wrist strap
   - Controller card
   - User name and password (if required)
2. Put on grounding wrist strap and follow anti-static procedures
3. Unpack and inspect new Quad T1 Framer card for damage.
   - Do not remove circuit cards from anti-static wrappers without following proper anti-static procedures.
   - Verify that equipment to be installed agrees with office records.
4. Verify that equipment to be installed agrees with office records.

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Verify Equipment Status

1. Start management session, if not already logged on.
2. Display clock source assignments by entering the following command:

   `show clock`

   A message similar to the following will appear.

   ```
   Primary Master Transmit Clock Source:    DS1 12
   Secondary Master Transmit Clock Source:  INTERNAL
   ```

3. Set all four DS1 circuits on QF card out of service to prevent alarms with the following command, where <*n*> is a range of four DS1 numbers such as 9-12:

   `set ds1` <*n*> **`down`**

   Example: set ds1 9-12 down

4. If no DS1s are used as a primary or secondary clock source on the Quad T1 Framer card to be removed, skip to *Remove Front Cover* on page 16-22.

Temporarily Move Clock Sources (if required)

1. Record original clock source assignments so they can be restored later.

NOTE: In the following two steps, the temporary clock source should be of equal or higher Stratum clock level, such as from a central office switch. In Access Navigators with the GR-303 option, the **`status ds1 all`** command will list the status of "switch" type DS1s as "In Service."

2. Move primary clock source (if any) to a DS1 on a different QF card with the following command, where <*n*> is the DS1 number:

   `set clock1 ds1` <*n*>

   Example: set clock1 ds1 25

3. Move secondary clock source (if any) to a DS1 on a different QF card with the following command, where <*n*> is the DS1 number:

   `set clock2 ds1` <*n*>

   Example: set clock2 ds1 29

4. Verify clock source settings with the following command, where <*n*> is the DS1 number:

   `show clock`

   A message similar to the following will appear.

   ```
   Primary Master Transmit Clock Source:    DS1 12
   Secondary Master Transmit Clock Source:  INTERNAL
   ```


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Remove Front Cover

DANGER! BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.

1. Loosen captive thumbscrews on front cover (see Figure 16-9).
2. Remove front cover and set aside.

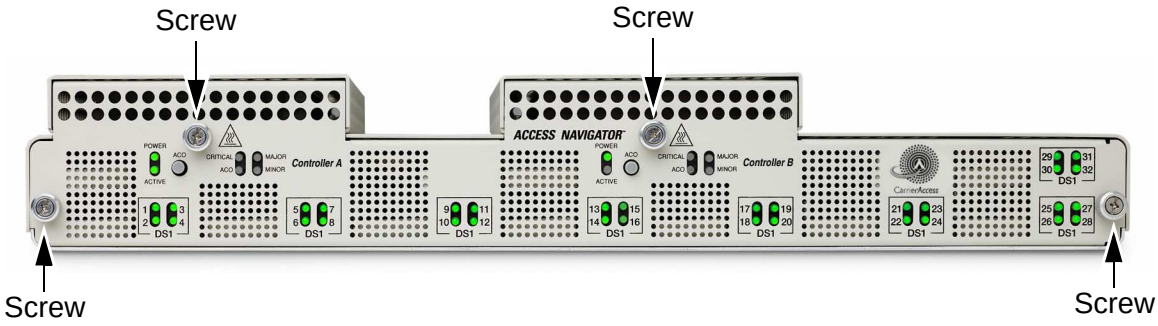

Figure 16-9. Location of Front Panel Cover Screws

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Replace Quad T1 Card

CAUTION! **REMOVING A QUAD T1 FRAMER CARD WILL DISRUPT SERVICE ON ALL FOUR OF THE DS1 CIRCUITS CARRIED BY THE CARD.**

1. Locate old Quad T1 Framer card to be replaced (see Figure 16-10).

NOTE: Figure 16-11 shows replacement of QF card #6.

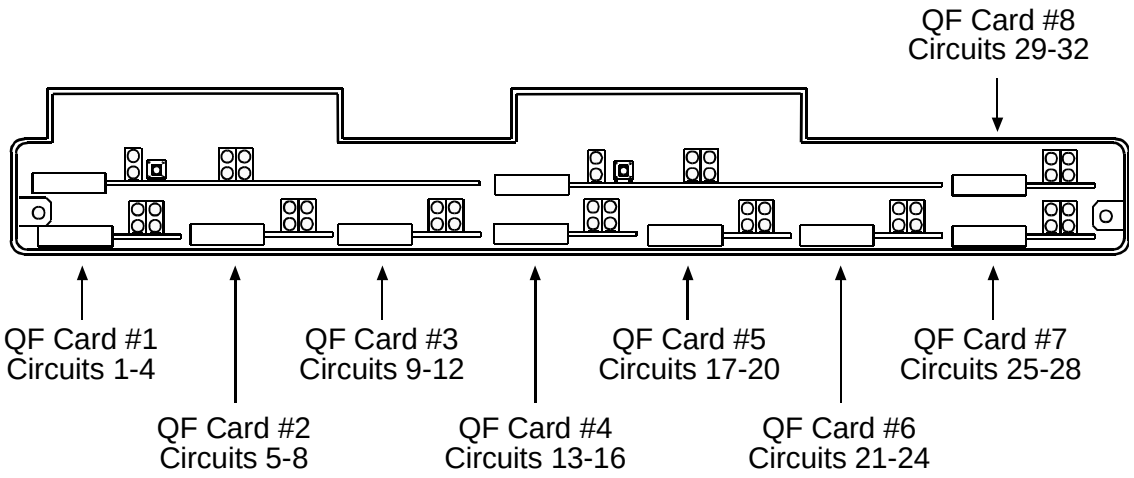

Figure 16-10. Location of Quad T1 Framer Cards

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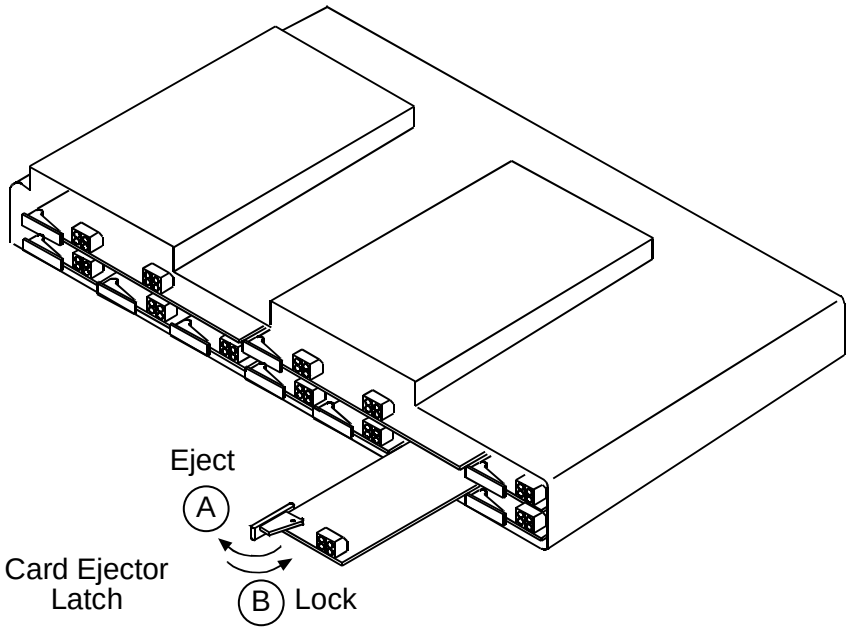

Figure 16-11. Installing Quad T1 Framer Card

2. Straighten card ejector latch (see Figure 16-11) to loosen old QF card. Carefully slide QF card out of slot and set aside.
3. Remove new QF card from antistatic wrapper and straighten card ejector latch (see A in Figure 16-11).
4. Position new QF card in guide rails and carefully slide into slot until it mates with backplane connector.
5. Press card ejector latch in toward center of card (see B in Figure 16-11) to secure card in card slot.
6. Put old QF card in antistatic wrapper for return to repair facility.

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Verify Operation

1. Display equipment status of Quad T1 Framer card with the following command:

   `status equipment`

   A message similar to the following will appear.

```
Equipment      Status              Version
---------      ------              -------
Controller A   Active              01.70
Controller B   Standby             01.70
DS1 Card 1     Installed            1
DS1 Card 2     Installed            1
DS1 Card 3     Installed            1
DS1 Card 4     Installed            1
DS1 Card 5     Installed            1
DS1 Card 6     Installed            1
DS1 Card 7     Card not installed
DS1 Card 8     Card not installed
```

   Requirement: Equipment status shows new DS1 card is installed.

NOTE: Refer to office records to determine which DS1s are to be put back in service.

NOTE: If desired, you can also test unused DS1 circuits in the following steps. Temporarily create a loopback between the DS1 transmit and receive signals by cross-connecting them at the patch panel. Then set the unused DS1s in service to observe status indications and messages.

2. Set DS1 circuits back in service with the following command, where <*n*> is the DS1 number or range of numbers:

   `set ds1` <*n*> **`up`**

   Example: set ds1 9 up

   Example: set ds1 9-12 up

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NOTE: DS1 status indicators will not light if DS1 is set out of service. DS1 status indicators will not light green if framing or line coding are mismatched with DSX-1 source.

3. Verify the following front panel status indications (see Figure 16-12).

   Requirement: DS1 status indicators will blink yellow for up to 15 seconds, then light green when frame synchronization is established.

.

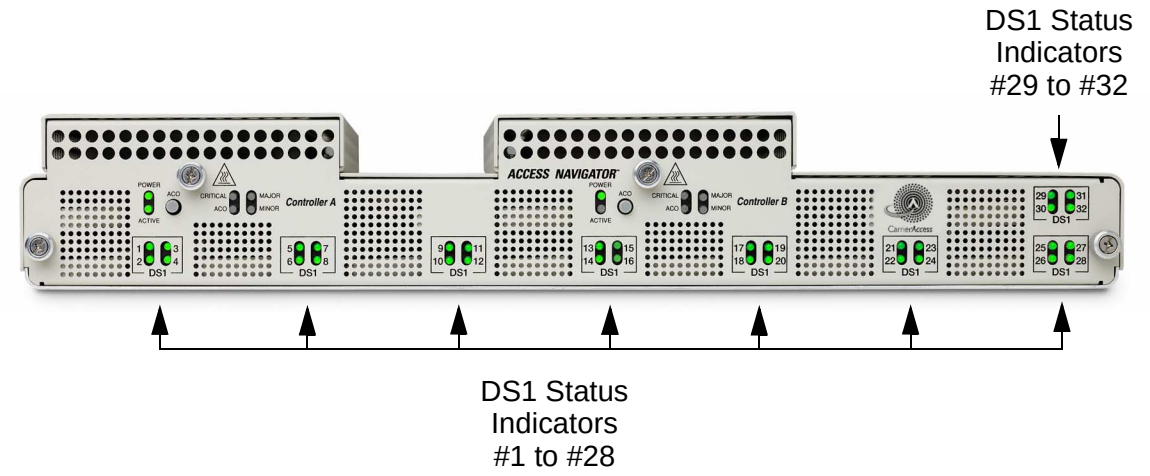

Figure 16-12. Location of Front DS-1 Status Indicators

4. Display status of DS1s on Quad T1 Framer card by entering the following command:

   `status ds1` <n>

   Example: status ds1 1

   Example: status ds1 9-12

   A message similar to the following will appear for each DS1.

```
Status for DS1 1:
    Receive:                Traffic
    Transmit:               Traffic
    Loop:                   None
    State:                  In use as DROP
    FDL Type:               None
```

   Requirement: DS1 status display shows Traffic in receive and transmit directions of active circuits.

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

5. If primary clock source was NOT temporarily moved, skip to *Replace Front Cover* on page 16-27.

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Restore Clock Sources (if required)

1. If primary clock source was temporarily moved, restore original clock source with the following command, where <*n*> is the DS1 number:

   `set clock1 ds1` <*n*>

   Example: set clock1 ds1 25

2. If secondary clock source was temporarily moved, restore original clock source with the following command, where <*n*> is the DS1 number:

   `set clock2 ds1` <*n*>

   Example: set clock2 ds1 29

3. If either clock source has been moved, verify restored clock source settings with the following command, where <*n*> is the DS1 number:

   `show clock`

   A message similar to the following will appear.

   ```
   Primary Master Transmit Clock Source:    DS1 12
   Secondary Master Transmit Clock Source:  INTERNAL
   ```

4. End management session by entering following command:

   `exit`

Replace Front Cover

DANGER! FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.

Replace front cover and tighten screws.

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Install SIMM on Controller Card

Procedure Summary

- Overview ... 16-3
- Precautions ... 16-4
- Tools and Materials Required ... 16-4
- Verify Equipment Status ... 16-5
- Determine Which Replacement Procedure to Use ... 16-5
- Replace Protected Controller Card ... 16-6
- Replace Unprotected Controller Card ... 16-13

Overview

NOTE: A SIMM (memory module) is required for software version 1.20 and higher.

This procedure applies to an Access Navigator with two (redundant) Controller cards. In a redundant system, the SIMM can be installed on the standby Controller without disrupting service. Then, by using a CLI command to switch the active Controller to standby, a SIMM can be installed on the other Controller.

To prevent service disruptions in an unprotected system with only one Controller card, another Controller with compatible software can be installed temporarily (see *Install Redundant Controller Card* on page 6-49). The temporary Controller is switched to active mode before removing the original Controller for SIMM installation using this procedure. After installation, the original Controller is switched to active mode before removing the temporary Controller.

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Precautions

CAUTION! **SERVICE DISRUPTIONS WILL OCCUR IF THE ACTIVE CONTROLLER CARD IS REMOVED WITHOUT AN OPERATIONAL STANDBY CONTROLLER. TO AVOID SERVICE DISRUPTIONS, ALWAYS REMOVE THE STANDBY CONTROLLER FIRST. IN A PROTECTED SYSTEM WITH TWO CONTROLLER CARDS, THE ACTIVE CONTROLLER SHOULD BE SWITCHED TO STANDBY MODE BEFORE REMOVING. IN AN UNPROTECTED SYSTEM WITH ONLY ONE CONTROLLER CARD, SIMM INSTALLATION WILL DISRUPT SERVICE BUT WILL NOT AFFECT STORED PROVISIONING DATA.**

WARNING! **THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.**

Tools and Materials Required

Obtain the following tools and materials.

- Office records for installation site
- Screwdrivers, slotted
- Grounding wrist strap
- SIMM, 8 MB (included with software update 1.25)

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Verify Equipment Status

1. Start management session, if not already logged on.
2. Display current Controller status by entering the following command:

   `status equipment`

   A message similar to the following will appear, showing the equipment card slots, service status, and Controller software version.

```
Equipment        Status             Version
---------        ------             -------
Controller A     Active              1.70
Controller B     Standby             1.70
DS1 Card 1       Installed           1
DS1 Card 2       Installed           1
DS1 Card 3       Installed           1
DS1 Card 4       Installed           1
DS1 Card 5       Installed           1
DS1 Card 6       Installed           1
DS1 Card 7       Card not installed
DS1 Card 8       Card not installed
```

NOTE: In a system with two Controller cards, one Controller will have “Active” status and the other will have “Standby” status. A defective Controller card will have an “Unknown” status, indicating that the card is installed but not responding.

NOTE: If a software upgrade to version 1.20 or higher is performed on a standby Controller without a SIMM installed, the Controller’s POWER indicator will remain yellow until the required SIMM is installed. The **`status equipment`** command will show that a SIMM is required.

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CAUTION! **SERVICE DISRUPTIONS WILL OCCUR IF THE ACTIVE CONTROLLER CARD IS REMOVED WITHOUT AN OPERATIONAL STANDBY CONTROLLER. TO AVOID SERVICE DISRUPTIONS, ALWAYS REMOVE THE STANDBY CONTROLLER FIRST. IN A PROTECTED SYSTEM WITH TWO CONTROLLER CARDS, THE ACTIVE CONTROLLER SHOULD BE SWITCHED TO STANDBY MODE BEFORE REMOVING. IN AN UNPROTECTED SYSTEM WITH ONLY ONE CONTROLLER CARD, SIMM INSTALLATION WILL DISRUPT SERVICE BUT WILL NOT AFFECT STORED PROVISIONING DATA.**

TO AVOID SERVICE DISRUPTIONS, ALWAYS INSTALL THE SIMM ON THE CONTROLLER THAT IS IN STANDBY (NOT ACTIVE). THEN SWITCH THE UPGRADED CONTROLLER TO ACTIVE MODE BEFORE INSTALLING SIMM ON OTHER CONTROLLER.

3. Visually verify which Controller card (A or B) is in standby (see Figure 16-3). The LED indicators on the standby Controller should be as follows:
   - Standby CONTROLLER ACTIVE/STANDBY indicator is off.
   - Standby CONTROLLER POWER indicator lights green.

.

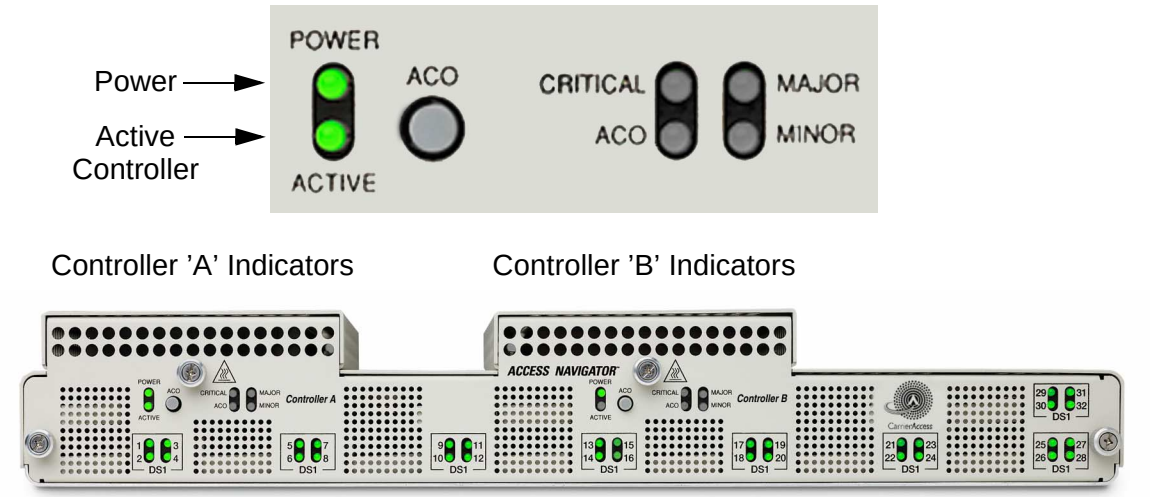

Figure 16-13. Location of Front Panel Controller Status LEDs

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Remove Front Cover

WARNING! THE ACCESS NAVIGATOR CONTAINS CIRCUIT CARDS AND COMPONENTS THAT ARE SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALWAYS FOLLOW THE *STATIC-SENSITIVE EQUIPMENT HANDLING PROCEDURES* ON page 6-3 WHEN OPENING EQUIPMENT COVERS AND HANDLING PLUG-IN CIRCUIT CARDS.

1. Put on grounding wrist strap and follow anti-static procedures.

DANGER! BURN HAZARD. CHASSIS, COVER SCREWS, AND CARDS MAY BE HOT TO THE TOUCH.

2. Loosen captive thumbscrews on front cover (see Figure 16-14).
3. Remove front cover and set aside.

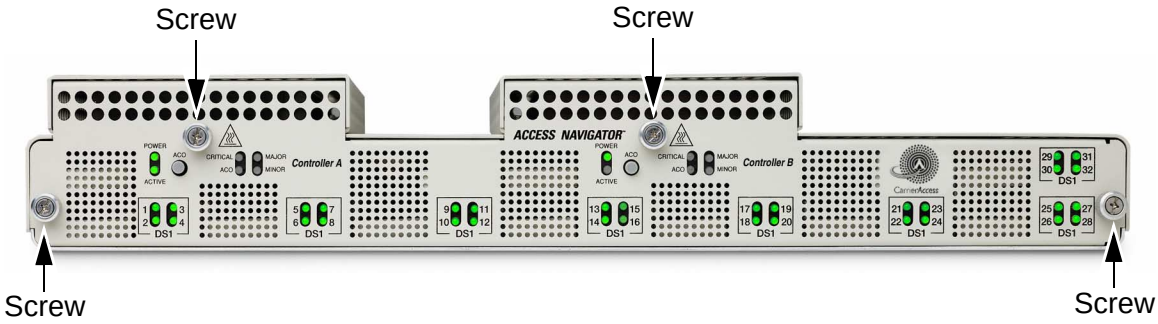

Figure 16-14. Location of Front Panel Cover Screws

4. Remove front cover and set aside.

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Install SIMM

CAUTION! **DO NOT REMOVE THE ACTIVE CONTROLLER CARD.**

1. Locate standby Controller card slot (see Figure 16-2).

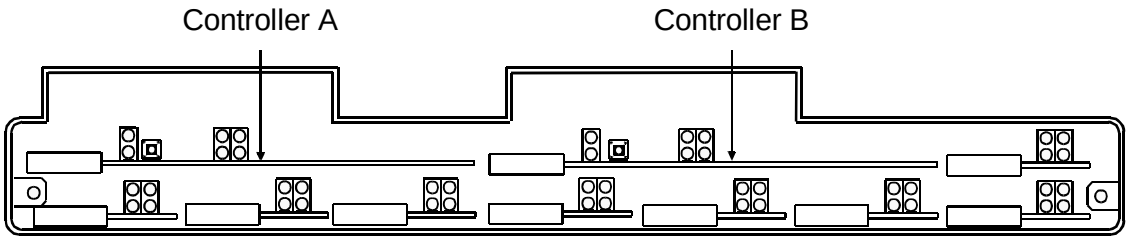

Figure 16-15. Location of Controller Cards

NOTE: The example in Figure 16-16 shows installation and removal of Controller B.

2. Push both card ejector latches on standby Controller toward outside of card until card connector releases with backplane connector (see A in Figure 16-16).
3. Slide standby Controller partially out of card slot to expose SIMM socket (see B in Figure 16-16).
4. Remove SIMM from anti-static bag.
5. Hold SIMM at about a 45 degree angle with notch positioned at front of socket (see C in Figure 16-16) and insert connector edge of SIMM into socket.
6. Push SIMM down toward circuit board until it snaps into socket clamps (see D in Figure 16-16).
7. Carefully slide upgraded Controller back into card slot.
8. Press card ejector latches in toward center of card until card connector mates with backplane connector (see E in Figure 16-16).

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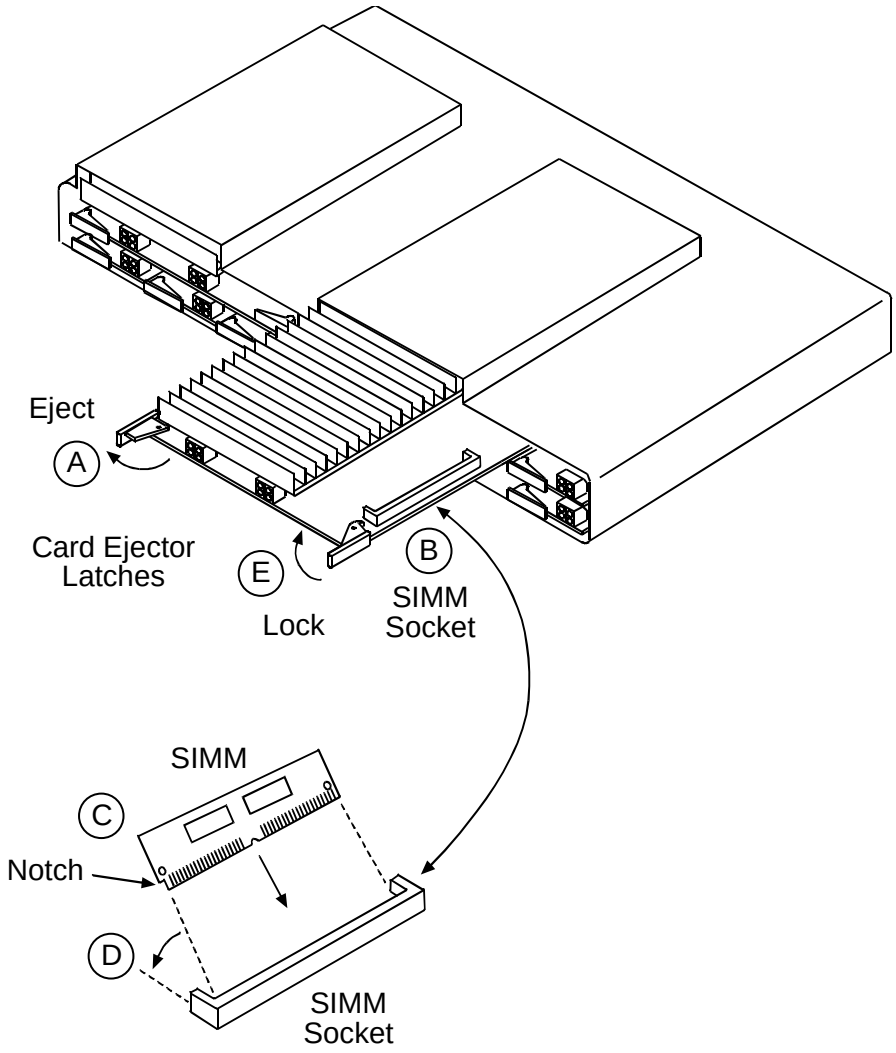

Figure 16-16. Installing Controller Card SIMM

NOTE: If status indications are not correct, refer to *Diagnostics & Troubleshooting* on page 15-1.

9. Verify power-on status of upgraded Controller. The LED indicators should be as follows:

   Requirement: Upgraded CONTROLLER POWER indicator lights green.

10. Wait two minutes for upgraded Controller to learn system settings.
11. Verify upgraded Controller status by entering the following command:

    `status equipment`

    Requirement: Upgraded Controller status is “Standby”.

12. Put upgraded Controller into active mode by entering following command:

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```
switch controller
```

13. Verify active status of upgraded Controller. The LED indicators should be as follows:

    Requirement: Upgraded CONTROLLER ACTIVE/STANDBY indicator lights green.

14. Verify operational status of upgraded Controller by entering the following command:

    ```
    status equipment
    ```

    Requirement: Upgraded Controller status is “Active”.

15. To install SIMM on other Controller card, repeat procedure starting at Step 1.
16. End management session by entering following command:

    ```
    exit
    ```

Replace Front Cover

DANGER! FIRE HAZARD. STANDARDS UL 1950 AND C22.2 NO. 950.95 REQUIRE THAT ALL ACCESS COVERS BE REPLACED TO PREVENT FIRES FROM SPREADING TO NEARBY EQUIPMENT.

Replace front cover and tighten screws.

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CHAPTER 17

Update Controller Card Software

In this Chapter

- Overview ... 17-2
- Update Software via TFTP (Two Controllers) ... 17-3
- Update Software via Xmodem (Two Controllers) ... 17-12
- Update Software via Xmodem (One Controller) ... 17-18

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Overview

This procedure provides steps for updating the operating system software in each Controller card's flash memory. Upgrading software does not affect provisioning and other configuration settings unless the update alters the function of the system, such as adding GR-303 functions to a DCS system.

The Access Navigator can hold two (redundant) Controller cards for time-slot interchange. In a protected redundant system, the software in the standby Controller can be updated locally or remotely by a Telnet or RS-232 management session without disrupting service. The other card can then be updated by using a CLI command to switch the standby Controller to active, allowing the second Controller (now in standby) to be updated.

Updating an Access Navigator with an unprotected (non-redundant) Controller will disrupt service. If a service interruption is not acceptable, it is recommended that the Controller card be physically replaced by a Controller card with updated software, as described in *Replace Controller Card* on page 16-3.

Updates use either Trivial File Transfer Format (TFTP) over an Ethernet IP connection or a terminal emulation program such as Hyper Terminal using Xmodem file transfer protocol. TFTP is much faster than Xmodem.

NOTE: TFTP is strongly recommended for updating software because you can also use TFTP to upload a copy of the Access Navigator configuration settings to protect against accidental loss.

Download Procedures

NOTE: Choose download procedure based on system configuration and type of management session.

- To update a **redundant** system via **TFTP**, go to *Update Software via TFTP (Two Controllers)* on page 17-3
- To update a **redundant** system via **Xmodem**, go to *Update Software via Xmodem (Two Controllers)* on page 17-12
- To update a **nonredundant** system via **Xmodem**, go to *Update Software via Xmodem (One Controller)* on page 17-18

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Update Software via TFTP (Two Controllers)

Procedure Summary

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- Verify IP Connectivity ... 17-7
- Upload Configuration ... 17-7
- Download Software ... 17-8
- Download Configuration ... 17-10

Overview

TFTP Requirements

The Controller update software file must be located on a TFTP file server accessible by both the Telnet management terminal and the Access Navigator. Trivial File Transfer Protocol (TFTP) allows a file to be sent over a network by specifying the server IP address and file name or path name. Using an RS-232 or Telnet management session, the operator sends a CLI “load tftp” command to the Access Navigator, specifying the location of the TFTP server and update file. TFTP server capabilities, including time-out settings, must match the bandwidth of the network being used. Depending on the file size and network speed, the file transfer may take several minutes.

Event Log

During the software update process, the two Controller cards will momentarily be operating with different software. The Access Navigator event log will contain an entry stating that one of the Controllers is Incompatible. This message is normal and can be ignored if both Controllers are updated with the same software.

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Precautions

CAUTION! THIS PROCEDURE APPLIES ONLY TO ACCESS NAVIGATORS WITH TWO CONTROLLER CARDS (PROTECTED OR REDUNDANT SYSTEM). DO NOT USE THIS PROCEDURE FOR UNPROTECTED SYSTEMS WITH ONLY ONE CONTROLLER CARD.

BEFORE DOWNLOADING NEW SOFTWARE, ALWAYS MAKE A BACKUP OF THE CURRENT CONFIGURATION SETTINGS TO PROTECT AGAINST ACCIDENTAL ERASURE. FOLLOW THE INSTRUCTIONS PROVIDED TO UPLOAD (SAVE) THE CONFIGURATION AND, IF NECESSARY, TO LOAD (DOWNLOAD) THOSE SETTINGS TO RESTORE THE ORIGINAL CONFIGURATION.

BOTH CONTROLLER CARDS MUST BE UPDATED TO THE SAME VERSION TO PREVENT SERVICE DISRUPTIONS RESULTING FROM INCOMPATIBLE DATABASE FORMATS. DO NOT MAKE ANY PROVISIONING CHANGES WITH MISMATCHED CONTROLLERS.

DO NOT UPDATE THE ACTIVE CONTROLLER CARD. UPDATING SOFTWARE IN THE ACTIVE CONTROLLER CARD WILL DISRUPT SERVICE. ALL EXISTING CROSS-CONNECTS WILL BE RESET. THE REDUNDANT CONTROLLER WILL NOT BECOME ACTIVE. NORMAL OPERATION WILL NOT RESUME UNTIL THE UPDATE PROCESS IS COMPLETE.

SERVICE DISRUPTIONS MAY OCCUR IF THE SOFTWARE UPDATE ALTERS THE MAJOR FUNCTIONS OF THE CONTROLLER CARD, SUCH AS ADDING GR-303 FEATURES TO A DCS CARD. AFTER PERFORMING ANY MAJOR UPDATE, IT IS RECOMMENDED THAT THE PROVISIONING OF ALL CIRCUITS BE VERIFIED.

CONTROLLER CARD SOFTWARE VERSIONS 1.20 AND HIGHER REQUIRE THAT A SIMM (MEMORY MODULE) BE INSTALLED FOR OPERATION. ATTEMPTING TO UPDATE THE SOFTWARE BEFORE A SIMM IS INSTALLED WILL DISRUPT SERVICE. SEE *INSTALL SIMM ON CONTROLLER CARD* ON **page 16-28**.

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Information and Materials Required

Obtain the following items.

- Office records for installation site
- User name (if required)
- Password (if required)
- Update software file for Controller

Install Optional TFTP Server Software

You will need a TFTP server running on a computer on the Ethernet network. If you do not have a TFTP server, you can use the Windows-based freeware program file called "tftpd32.zip". You can download this file from the Carrier Access Customer Support web site. To obtain information for logging into the site's Product Support section, please contact Carrier Access Customer Support at 800-786-9929.

1. Create a folder on your PC's C: drive called "Access Navigator Backup". This folder is where you will keep all of your Access Navigator backup configurations.
2. Log into the Carrier Access Customer Support web site: http://www.carrieraccess.com/support/index.cfm/fuseaction/login_form.htm
3. Double-click on the tftpd32.zip file you need to download and save it to the "Access Navigator Backup" folder.
4. Unzip the tftpd32.zip file into the "Access Navigator Backup" folder.
5. After the files are unzipped, click on the tftpd32 application icon to start the TFTP server. Once this server is running on the network, you will be ready to upload your configuration files to your PC.
6. Make sure the base directory of the TFTP server is the folder you created on the C drive called "Access Navigator Backup". This is where the TFTP server will store the backup files.

NOTE: If desired, a laptop PC with Ethernet can usually be connected directly to the Ethernet port on the Access Navigator using a "crossover" cable. See *Make Ethernet Cable (Optional)* on page 6-22.

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Verify Equipment Status

1. If you are not currently logged into the Access Navigator, start an RS-232 or Telnet management session.
2. Verify current Controller software version with the following command:

   `status equipment all`

   A message similar to the following will appear, showing the Controller cards installed and the software version.

```
Equipment        Status                 Version
---------        ------                 -------
Controller A     Active                 01.77 GR-303 Option
Controller B     Standby                01.77 GR-303 Option
DS1 Card 1       Installed                 1
DS1 Card 2       Installed                 1
DS1 Card 3       Installed                 1
DS1 Card 4       Installed                 1
DS1 Card 5       Installed                 1
DS1 Card 6       Installed                 1
DS1 Card 7       Card not installed        1
DS1 Card 8       Card not installed        1

                                Active     Standby
                                ------     -------
   SW Build Number              17701      17701
   Boot Code Revision           01.09      01.07
   FPGA Code Revision           1.06       1.06
```

   Requirement: One Controller is in "Standby".

WARNING! DO NOT CONTINUE THIS PROCEDURE IF THE CONTROLLER VERSION IS 01.70 UP TO AND INCLUDING 01.80 OR IF THE BOOT CODE REVISION IS 01.07 OR 01.08. USE THE UPGRADE PROCEDURE IN PRODUCT TECHNICAL NOTE PTN-03-004, AVAILABLE BY CALLING CARRIER ACCESS CUSTOMER SUPPORT AT (800) 495-5455.

CAUTION! DO NOT CONTINUE THIS PROCEDURE IF ONE CONTROLLER IS NOT IN STANDBY. THIS INDICATES THE SYSTEM IS NOT PROTECTED BECAUSE THE SECOND CONTROLLER IS EITHER NOT OPERATIONAL (STATUS UNKNOWN) OR IS NOT INSTALLED.

IF THE CONTROLLER IS NOT OPERATIONAL, REPLACE THE FAILED CONTOLLER BEFORE UPDATING SOFTWARE (SEE *REPLACE CONTROLLER CARD* ON page 16-3).

IF THERE IS ONLY ONE CONTROLLER CARD IN THE SYSTEM, SEE *UPDATE SOFTWARE VIA XMODEM (ONE CONTROLLER)* ON page 17-18.

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Verify IP Connectivity

Verify IP connectivity between the Access Navigator and the TFTP server's IP address with the following command:

ping <*ipaddress*>

```
Example: ping 192.168.118.65
            PING 192.168.118.65: 64 data bytes
            Reply from 192.168.118.65: bytes = 64
```

Upload Configuration

This step will protect against accidental loss of Access Navigator configuration settings. If the software update procedure is followed carefully, the configuration settings on the Controller cards will be preserved and updated as required. However, it is prudent to keep a current backup of the configuration that can be restored (see *Download Configuration* on page 17-10).

CAUTION! CONFIGURATION FILES ARE NOT COMPATIBLE BETWEEN DIFFERENT SOFTWARE VERSIONS (INCLUDING FEATURE OPTIONS SUCH AS DCS, GR-303, OR P-PHONE). SERVICE DISRUPTIONS CAN OCCUR IF A CONFIGURATION FILE CREATED BY ONE SOFTWARE VERSION IS DOWNLOADED TO AN ACCESS NAVIGATOR RUNNING A DIFFERENT VERSION.

NOTE: The **upload** command reads the Access Navigator configuration database from flash memory and saves the settings in file format. This binary file may be used as a backup copy of the present configuration or as a template for downloading to other Access Navigators with the same software version. Because the IP settings are not saved, the file can be used with any Access Navigator having the same software version and DCS, GR-303, and P-Phone option. File transfer normally takes only a few seconds.

Upload current configuration settings with the following command:

upload tftp config <*ipaddress*> <*"file"*>

```
Example: upload tftp config 192.168.118.65 "AN26"
            0131088 bytes transferred
            Configuration upload succeeded.
```

Field	Description
ipaddress	IP address where configuration file is to be stored. (This is the IP address of the TFTP server.) IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.

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Field	Description
file	File name used to save the configuration data. The file and optional path must be enclosed in quotes, as in "C:\CONFIG\AN26". The default path is the root directory of the TFTP server.
blocksize	Transmission block size (optional), 512 to 8192. The default is 8192 bytes.

Download Software

NOTE: In the following step, you must enter the IP address of the TFTP server and the file name or path name of the update software. The name must be enclosed in quotes.

Carrier Access software file names are shortened for compatibility with PC and UNIX systems. For example, a CA part number for GR-303 software such as 019-0050 version 1.80 would be shortened to 0050180.303. Similarly, the DCS software would be shortened to 00510180.DCS, and the GR-303 P-Phone software would be shortened to 02310180.EBS. Boot code software version 01.09 would be named BT0109.MGM.

During the load operation, the standby Controller will report its status as “Card Failed” so that the active Controller will reject **`switch controller`** commands until the software update process is complete.

1. Send load command to update standby Controller with the following command:

   `load tftp standby` *<ipaddress> <"file">*

   `Example: load tftp standby 192.168.118.65 "00500172.303"`

   `Example: load tftp standby 192.168.118.65 "C:\CA\00510172.DCS"`

NOTE: Depending on the file size and network speed, the file transfer may take several minutes.

2. Wait two minutes to allow updated Controller card to boot up and learn system configuration settings.
3. Verify current Controller status and software version with following command:

   `status equipment`

   Requirement: Updated Controller is in “Standby”, indicating it is operational.

   Requirement: Standby Controller shows new software version.

4. If active Controller has version greater than 1.1x software (version number starts with the digits 1.1), skip to Step 10.

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CAUTION! **THE FOLLOWING STEPS ARE REQUIRED TO ENSURE THAT THE DS0 DATABASE IS COPIED TO THE UPDATED CONTROLLER AND WILL AFFECT ONE DS0. TO AVOID SERVICE DISRUPTIONS, SELECT A DS0 THAT IS "DOWN" OR NOT ASSIGNED TO ANY USER.**

NOTE: The following step uses DS0 32:1 as an example. If this DS0 is currently assigned to a user, substitute another DS0 that is not being used.

5. Determine current service state of DS0 with following command:

   `show ds0 32:1`
6. If the DS0 Up/Down service state listed as DOWN, go to next step. If UP, go to step 11.
7. Set DS0 service state up and then down with following commands:

   `set ds0 32:1 up`
   `set ds0 32:1 down`
8. Go to Step 12
9. Set DS0 service state down and then up with following commands:

   `set ds0 32:1 down`
   `set ds0 32:1 up`

NOTE: Because you are logged into the currently active Controller, switching Controllers in the next step will terminate the current management session.

10. Make the redundant Controller active with following command:

    `switch controller`
11. Initiate another management session. (For RS-232 management, just press the keyboard Enter or Return key. For Telnet management, disconnect the link and reconnect to the IP address of the Access Navigator.)
12. Send load command to update standby Controller with the following command:

    `load tftp standby` *`<ipaddress> <"file">`*
13. Wait until "Software update succeeded." message appears before continuing to next step.
14. Wait two minutes to allow updated Controller card to boot up and learn system configuration settings.
15. Verify current Controller status and software version with following command:

    `status equipment`

    Requirement: Updated Controller is in "Standby", indicating it is operational.

    Requirement: Standby Controller shows new software version.

    Requirement: Both Controllers show new software version.
16. Terminate management session with following command:

    `exit`

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Download Configuration

This step is optional and will restore the uploaded Access Navigator configuration settings if accidentally lost for any reason.

CAUTION! CONFIGURATION FILES ARE NOT COMPATIBLE BETWEEN DIFFERENT SOFTWARE VERSIONS (INCLUDING FEATURE OPTIONS SUCH AS DCS, GR-303, OR P-PHONE). SERVICE DISRUPTIONS CAN OCCUR IF A CONFIGURATION FILE CREATED BY ONE SOFTWARE VERSION IS DOWNLOADED TO AN ACCESS NAVIGATOR RUNNING A DIFFERENT VERSION.

CAUTION! THE ACCESS NAVIGATOR MUST BE RESET AFTER USING THE LOAD CONFIGURATION COMMAND. THIS WILL TEMPORARILY DISRUPT SERVICE.

1. Load current configuration settings with the following command:

   `load tftp config` *`<ipaddress> <"file">`*

   `Example: load tftp config 192.168.118.65 "AN26"`

   ```
   CAUTION:  This command needs to be followed by a system reset.
   Failure to do so could result in unpredictable results.

   Do you really want to load the configuration flash (y/n)? y

        0131088 bytes transferred

   Configuration download complete.
   Please do a 'reset all' at this time.
   ```

   .

Field	Description
ipaddress	IP address where configuration file is to be stored. (This is the IP address of the TFTP server.) IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.
file	File name used to save the configuration data. The file and optional path must be enclosed in quotes, as in "C:\CONFIG\AN26". The default path is the root directory of the TFTP server.
blocksize	Transmission block size (optional), 512 to 8192. The default is 8192 bytes.

2. Reset Access Navigator with the following command:

   `reset all`

   `Example: reset all`

   ```
   Do you really want to reset (y/n)? y
   ```


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Update Software via Xmodem (Two Controllers)

Procedure Summary

- Overview ... 17-12
- Precautions ... 17-13
- Information and Materials Required ... 17-14
- Verify Equipment Status ... 17-14
- Download Software ... 17-15

Overview

Xmodem Requirements

The Controller update software file must be located on a compact disk (CD), hard drive, or file server accessible by the craft terminal or management computer through a file name or path name. File transfers are accomplished using Xmodem protocol, which is supported by most terminal emulation programs, such as Microsoft HyperTerminal. Using an RS-232 management session, the operator sends a CLI “load xmodem” command to the Access Navigator. The operator then instructs the terminal program to send the update file. Updating the standby Controller will take about 45 minutes.

Event Log

During the software update process, the two Controller cards will momentarily be operating with different software. The Access Navigator event log will contain an entry stating that one of the Controllers is Incompatible. This message is normal and can be ignored if both Controllers are updated with the same software.

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Precautions

CAUTION! THIS PROCEDURE APPLIES ONLY TO ACCESS NAVIGATORS WITH TWO CONTROLLER CARDS (PROTECTED OR REDUNDANT SYSTEM). DO NOT USE THIS PROCEDURE FOR UNPROTECTED SYSTEMS WITH ONLY ONE CONTROLLER CARD.

BOTH CONTROLLER CARDS MUST BE UPDATED TO THE SAME VERSION TO PREVENT SERVICE DISRUPTIONS RESULTING FROM INCOMPATIBLE DATABASE FORMATS. DO NOT MAKE ANY PROVISIONING CHANGES WITH MISMATCHED CONTROLLERS.

UPDATING SOFTWARE IN THE ACTIVE CONTROLLER CARD WILL DISRUPT SERVICE. ALL EXISTING CROSS-CONNECTS WILL BE DISRUPTED UNTIL THE UPDATE PROCESS IS COMPLETE. THE REDUNDANT CONTROLLER (IF ANY) WILL NOT BECOME ACTIVE. NORMAL OPERATION WILL NOT RESUME UNTIL THE UPDATE PROCESS IS COMPLETE.

SERVICE DISRUPTIONS MAY OCCUR IF THE SOFTWARE UPDATE ALTERS THE MAJOR FUNCTIONS OF THE CONTROLLER CARD, SUCH AS ADDING GR-303 FEATURES TO A DCS CARD. BEFORE AND AFTER PERFORMING ANY MAJOR UPDATE, IT IS RECOMMENDED THAT THE PROVISIONING OF ALL CIRCUITS BE VERIFIED.

CONTROLLER CARD SOFTWARE VERSIONS 1.20 AND HIGHER REQUIRE THAT A SIMM (MEMORY MODULE) BE INSTALLED FOR OPERATION. ATTEMPTING TO UPDATE THE SOFTWARE BEFORE A SIMM IS INSTALLED WILL DISRUPT SERVICE. SEE *INSTALL SIMM ON CONTROLLER CARD* ON **page 16-28**.

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Information and Materials Required

Obtain the following items.

- Office records for installation site
- User name (if required)
- Password (if required)
- Update software file for Controller

Verify Equipment Status

1. If you are not currently logged into the Access Navigator through an RS-232 management session, start an RS-232 management session.
2. Verify current Controller software version with the following command:

   `status equipment all`

   A message similar to the following will appear, showing the Controller cards installed, their status, and the software version.

```
Equipment        Status                Version
---------        ------                -------
Controller A     Active                01.77 GR-303 Option
Controller B     Standby               01.77 GR-303 Option
DS1 Card 1       Installed                1
DS1 Card 2       Installed                1
DS1 Card 3       Installed                1
DS1 Card 4       Installed                1
DS1 Card 5       Installed                1
DS1 Card 6       Installed                1
DS1 Card 7       Card not installed       1
DS1 Card 8       Card not installed       1

                                Active     Standby
                                ------     -------
   SW Build Number              17701      17701
   Boot Code Revision           01.09      01.07
   FPGA Code Revision           1.06       1.06
```

   Requirement: One Controller is in "Standby".

WARNING! DO NOT CONTINUE THIS PROCEDURE IF THE CONTROLLER VERSION IS 01.70 UP TO AND INCLUDING 01.80 OR IF THE BOOT CODE REVISION IS 01.07 OR 01.08. USE THE UPGRADE PROCEDURE IN PRODUCT TECHNICAL NOTE PTN-03-004, AVAILABLE BY CALLING CARRIER ACCESS CUSTOMER SUPPORT AT (800) 495-5455.

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CAUTION! **DO NOT CONTINUE THIS PROCEDURE IF ONE CONTROLLER IS NOT IN STANDBY. THIS INDICATES THE SYSTEM IS NOT PROTECTED BECAUSE THE SECOND CONTROLLER IS NOT OPERATIONAL. REFER TO *UPDATE SOFTWARE VIA XMODEM (ONE CONTROLLER)* ON page 17-18 FOR UPDATING AN UNPROTECTED (NONREDUNDANT) SYSTEM.**

Download Software

NOTE: During the load operation, the standby Controller will report its status as "Card Failed" so that the active Controller will reject **`switch controller`** commands until the software update process is complete.

1. Send load command to update standby Controller with the following command:

   `load xmodem standby`

NOTE: Carrier Access software file names are shortened for compatibility with PC and UNIX systems. For example, a CA part number for GR-303 software such as 019-0050 version 1.80 would be shortened to 0050180.303. Similarly, the DCS software would be shortened to 00510180.DCS, and the GR-303 P-Phone software would be shortened to 02310180.EBS. Boot code software version 01.09 would be named BT0109.MGM.

In the following step, the menu and key names may differ slightly, depending on the terminal emulation program being used.

2. Using Microsoft HyperTerminal (or similar program), do the following:
   - Select Transfer/Send File from the menu
   - Select Xmodem protocol
   - Enter Filename of update software (or use Browse feature to locate file)
   - Click on Send button

NOTE: Depending on the file size, the file transfer may take up to 30 minutes.

3. Wait until "Software update succeeded." message appears before continuing to next step.
4. Wait two minutes to allow updated Controller card to boot up and learn system configuration settings.
5. Verify current Controller status and software version with following command:

   `status equipment`

   Requirement: Updated Controller is in "Standby", indicating it is operational.

   Requirement: Standby Controller shows new software version.

6. If active Controller has version greater than 1.1x software (version number starts with the digits 1.1), skip to Step 12.

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CAUTION! **THE FOLLOWING STEPS ARE REQUIRED FOR OLDER 1.1X SOFTWARE TO ENSURE THAT THE DS0 DATABASE IS COPIED TO THE UPDATED CONTROLLER AND WILL AFFECT ONE DS0. TO AVOID SERVICE DISRUPTIONS, SELECT A DS0 THAT IS "DOWN" OR NOT ASSIGNED TO ANY USER.**

NOTE: The following step uses DS0 32:1 as an example. If this DS0 is currently assigned to a user, substitute another DS0 that is not being used.

7. Determine current service state of DS0 with following command:

   ```
   show ds0 32:1
   ```

8. If the DS0 Up/Down service state listed as DOWN, go to next step. If UP, go to Step 11.
9. Set DS0 service state up and then down with following commands:

   ```
   set ds0 32:1 up
   set ds0 32:1 down
   ```

10. Go to Step 12.
11. Set DS0 service state down and then up with following commands:

    ```
    set ds0 32:1 down
    set ds0 32:1 up
    ```

NOTE: Because you are logged into the currently active Controller, switching Controllers in the next step will terminate the current management session.

12. Make the redundant Controller active with following command:

    ```
    switch controller
    ```

13. Start another management session by pressing keyboard Enter or Return key.

NOTE: If the terminal program retains the settings from the previous file transfer, you may only need to click on the Send button again.

14. Using Microsoft HyperTerminal (or similar program), do the following:
    - Select Transfer/Send File from the menu
    - Select Xmodem protocol
    - Enter Filename if update software (or use Browse to locate file)
    - Click on Send button

NOTE: Depending on the file size, the file transfer may take up to 30 minutes.

15. Wait until "Software update succeeded." message appears before continuing to next step.
16. Wait two minutes to allow updated Controller card to boot up and learn system configuration settings.

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17. Verify current Controller status and software version with following command:

    `status equipment`

    Requirement: Updated Controller is in “Standby”, indicating it is operational.

    Requirement: Standby Controller shows new software version.

    Requirement: Both Controllers show new software version.

18. Terminate management session with following command:

    `exit`

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Update Software via Xmodem (One Controller)

Procedure Summary

- Overview ... 17-18
- Precautions ... 17-19
- Information and Materials Required ... 17-20
- Verify Equipment Status ... 17-20
- Download Software ... 17-21

Overview

Xmodem Requirements

The Controller update software file must be located on a compact disk (CD), hard drive, or file server accessible by the craft terminal or management computer through a file name or path name. File transfers are accomplished using Xmodem protocol, which is supported by most terminal emulation programs, such as Microsoft HyperTerminal. Using an RS-232 management session, the operator sends a CLI “load xmodem” command to the Access Navigator. The operator then instructs the terminal program to send the update file. Updating the active Controller will take about 30 minutes.

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Precautions

CAUTION! **THIS PROCEDURE APPLIES ONLY TO ACCESS NAVIGATORS WITH ONLY ONE CONTROLLER CARD (UNPROTECTED SYSTEM). DO NOT USE THIS PROCEDURE FOR PROTECTED SYSTEMS WITH TWO CONTROLLER CARDS (PROTECTED OR REDUNDANT SYSTEM).**

UPDATING SOFTWARE IN THE ACTIVE CONTROLLER CARD WILL DISRUPT SERVICE. ALL EXISTING CROSS-CONNECTS WILL BE RESET. THE REDUNDANT CONTROLLER WILL NOT BECOME ACTIVE. NORMAL OPERATION WILL NOT RESUME UNTIL THE UPDATE PROCESS IS COMPLETE.

SERVICE DISRUPTIONS MAY OCCUR IF THE SOFTWARE UPDATE ALTERS THE MAJOR FUNCTIONS OF THE CONTROLLER CARD, SUCH AS ADDING GR-303 FEATURES TO A DCS CARD. AFTER PERFORMING ANY MAJOR UPDATE, IT IS RECOMMENDED THAT THE PROVISIONING OF ALL CIRCUITS BE VERIFIED.

CONTROLLER CARD SOFTWARE VERSIONS 1.20 AND HIGHER REQUIRE THAT A SIMM (MEMORY MODULE) BE INSTALLED FOR OPERATION. ATTEMPTING TO UPDATE THE SOFTWARE BEFORE A SIMM IS INSTALLED WILL DISRUPT SERVICE. SEE *INSTALL SIMM ON CONTROLLER CARD* ON page 16-28.

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Information and Materials Required

Obtain the following items.

- Office records for installation site
- User name (if required)
- Password (if required)
- Update software file for Controller

Verify Equipment Status

1. If you are not currently logged into the Access Navigator, start an RS-232 management session.
2. Verify current Controller status and software version with following command:

   `status equipment`

   A message similar to the following will appear, showing the Controller cards installed and the software version.

```
Equipment         Status                 Version
---------         ------                 -------
Controller A      Active                 01.77
Controller B      Card not installed
DS1 Card 1        Installed                 1
DS1 Card 2        Installed                 1
DS1 Card 3        Installed                 1
DS1 Card 4        Installed                 1
DS1 Card 5        Installed                 1
DS1 Card 6        Installed                 1
DS1 Card 7        Card not installed        1
DS1 Card 8        Card not installed        1

                                  Active     Standby
                                  ------     -------
   SW Build Number                17701
   Boot Code Revision             01.09
   FPGA Code Revision             1.06
```

Requirement: Controller is “Active”.

Requirement: Controller shows old software version.

WARNING! DO NOT CONTINUE THIS PROCEDURE IF THE CONTROLLER VERSION IS 01.70 UP TO AND INCLUDING 01.80 OR IF THE BOOT CODE REVISION IS 01.07 OR 01.08. USE THE UPGRADE PROCEDURE IN PRODUCT TECHNICAL NOTE PTN-03-004, AVAILABLE BY CALLING CARRIER ACCESS CUSTOMER SUPPORT AT (800) 495-5455.

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3. Send load command to update active Controller with the following command:

   `load xmodem active`

NOTE: After entering the above command, the Access Navigator will return a message stating that its baud rate has been changed to 57,600. You must change the terminal's setting to 57,600 baud as described below.

Download Software

NOTE: Carrier Access software file names are shortened for compatibility with PC and UNIX systems. For example, a CA part number for GR-303 software such as 019-0050 version 1.80 would be shortened to 0050180.303. Similarly, the DCS software would be shortened to 00510180.DCS, and the GR-303 P-Phone software would be shortened to 02310180.EBS. Boot code software version 01.09 would be named BT0109.MGM.

NOTE: In the following step, the menu and key names may differ slightly, depending on the terminal emulation program being used.

1. Using Microsoft HyperTerminal (or similar program), do the following. (Similar steps may be used for other terminal emulation programs):
   - Select Call/Disconnect from the menu
   - Set transfer rate to 57,600 baud
   - Select Call/Connect from the menu
   - Select Transfer/Send File from the menu
   - Select Xmodem protocol
   - Enter Filename if update software (or use Browse to locate file)
   - Click on Send button

NOTE: Depending on the file size and network speed, the file transfer will take about 30 minutes.

2. Wait until "Software update succeeded." message appears before continuing to next step.
3. Set terminal transfer rate back to 9,600 baud.
   - Select Call/Disconnect from the menu
   - Set transfer rate to 9,600 baud
   - Select Call/Connect from the menu

NOTE: After receiving the software update, the Controller will reboot and restart using the new system software. This will terminate the current management session.

4. Wait two minutes to allow updated Controller card to boot up.
5. Initiate another management session by pressing keyboard Enter or Return key.

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6. Verify current Controller status and software version with following command:

   `status equipment`

   Requirement: Controller is “Active”.

   Requirement: Controller shows new software version.

7. Terminate management session with following command:

   `exit`

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CHAPTER 18

CLI Language Reference

In this Chapter

- Overview ... 18-2
- CLI Requirements ... 18-3
- CLI Conventions and Shortcuts ... 18-6
- Online Help ... 18-10
- Users and Passwords ... 18-14
- Logging In and Out ... 18-18
- CLI Command List ... 18-21

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Overview

The Command Line Interface (CLI) language uses simple text based commands and messages, and is designed for use with terminal and Telnet programs. CLI management provides complete control over the administration, configuration, provisioning, and maintenance functions of the Access Navigator.

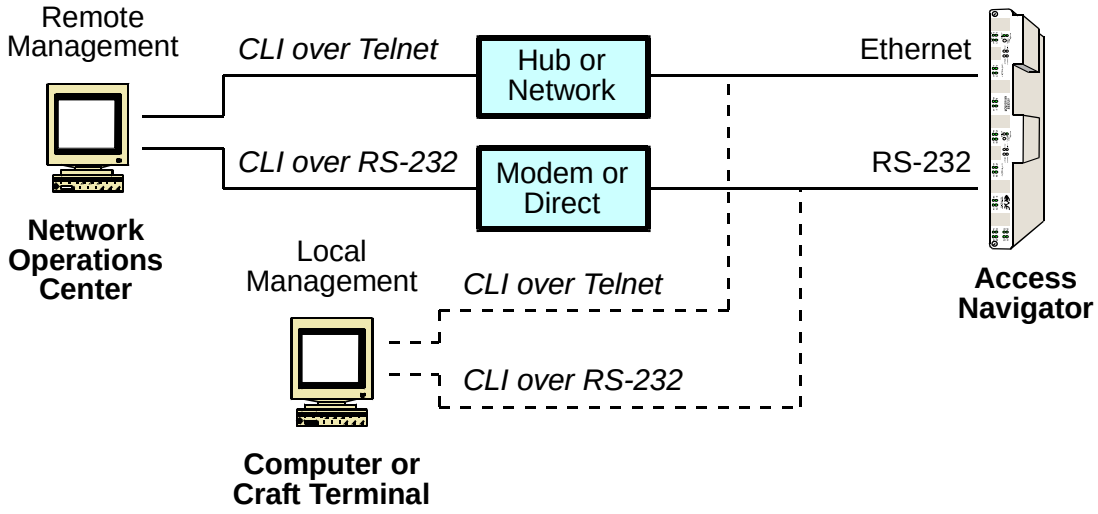

Figure 18-1. CLI Access Via RS-232 and Telnet

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CLI Requirements

- CLI over RS-232 ... 18-3
- CLI over Telnet ... 18-4
- Using CLI Command Scripts ... 18-5

Local and remote access are available through an RS-232 or Ethernet/Telnet link to the Access Navigator (see Figure 18-1). For convenience, the user may also send script files to speed up repetitive tasks (see *Using CLI Command Scripts* on page 18-5).

CLI over RS-232

The RS-232 interface supports a craft terminal or a computer with a terminal emulation program such as Microsoft HyperTerminal®. Communications travel over a link to the Access Navigator's RS-232 port.

Terminal emulation

- ASCII, ANSI, VT100
- Flow control: None
- Send mode: Echo characters locally
- Minimum screen size: 24 lines by 80 characters without scrolling

Port settings

- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: none
- Character delay: 0 ms (3 milliseconds if sending scripts)
- Line delay: 0 ms (insert appropriate delays if sending scripts)
  Note: For Adit 600 terminals, set line delay to 300 ms.

RS-232 interface for direct connections

These settings are for a direct connection to computer, craft terminal, or Network Operations Center.

- EIA RS-232C DCE-to-DTE cable required (see *RS-232 Management Connection* on page 6-17)
- DE9 (DB9) female connector

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RS-232 interface for modem connection

These settings are for a modem connection used for remote management via phone line.

- Modem must be initialized before connection to Access Navigator
- Modem initialization string:
  `at s0=1 e0 q1 &c0 &d0 &w`
- EIA RS-232C DCE-to-DCE cable required (see *RS-232 Management Connection* on page 6-17)
- DE9 (DB9) female connector

NOTE: Software upgrade via RS-232 of a system with only one Controller card requires a direct connection (no modem) using Xmodem protocol at 57,600 baud. The upgrade takes about 30 minutes.

CLI over Telnet

The Telnet interface uses a computer with a Telnet program. Communications are over an Internet (IP) network link to the Access Navigator's Ethernet port. Simultaneous, multiple Telnet sessions are supported. Telnet requires the IP address of the Access Navigator, initially assigned through the RS-232 interface.

Terminal emulation

- Telnet over TCP/IP

Ethernet interface

- Ethernet MDI port (DTE)
- EIA/TIA-568B 10Base-T
- RJ45 connector
- Category 3 (CAT3) or better cabling

Access Navigator IP address

- IP address format: *xxx.xxx.xxx.xxx* where *xxx* = 0 to 255 decimal
- Subnet mask format: *xxx.xxx.xxx.xxx*
- Gateway address format: *xxx.xxx.xxx.xxx* or **none** if not used

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Using CLI Command Scripts

For convenience, the operator may use CLI scripts to simplify repetitive tasks. Scripts are pre-recorded commands that can be played back by pressing a macro function key or by transferring a text file to the Access Navigator.

There are two considerations when using scripts: delays and errors.

Character and Line Delays

It is possible to play scripts back at maximum speed, with no delays between characters or between lines. However, with a fast network connection, the commands may arrive too quickly for the Access Navigator to process. To prevent this from occurring, the user may have to insert time delays. This can be accomplished by changing the terminal settings to insert time delays between each character and line. A character delay of 3 milliseconds is normally adequate. Line delays depend on the time required for the Access Navigator to execute the specific command line. For example, Adit 600 terminals need a line delay of at least 300 ms.

Confirmations and Errors

The safest way to use scripts is with a utility that monitors the replies from the Access Navigator, to ensure that the next command will not be sent before the Access Navigator is ready. The utility should also recognize when an error occurs, so the user will know when a script failed. Two features of the CLI language permit the utility to recognize command confirmations and errors. First, after completing each command, the Access Navigator returns a command prompt ending with the > symbol. Second, if the command cannot be executed, the Access Navigator returns an error message beginning with the * - symbol pair (see *Commands, Confirmations, and Error Messages* on page 18-6).

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CLI Conventions and Shortcuts

- Command Categories ... 18-6
- Commands, Confirmations, and Error Messages ... 18-6
- Text Conventions ... 18-7
- Command Syntax Descriptions ... 18-8
- Entering DS1 and DS0 Numbers and Ranges ... 18-9
- Command Shortcuts (Tabbing) ... 18-9
- Keyboard Shortcuts ... 18-9

Command Categories

Most CLI commands fall into one of the following three categories:

- **Set** commands establish the configuration parameters.
- **Show** commands display the "set" values of the parameters or performance data.
- **Status** commands display the current operating states or performance data.

Additional command categories include:

- **Alarms** and **Log** commands for finding service and performance problems.
- **Add** and **Delete** commands for attributes, interfaces, and names.
- **Connect** and **Disconnect** commands for crossconnections.
- **Read** commands for displaying Carrier Access remote terminal settings and status.
- **Send** commands for far-end loop tests and bit patterns.

Commands, Confirmations, and Error Messages

- Commands are entered to the right of the command prompt, which is the user-settable system identifier followed by the > symbol, as in the following example.

  ```
  SystemID>
  ```

- When typing a CLI command, you can use the backspace and delete keys to make corrections.
- After typing the CLI command, press the Enter or Return key on the terminal keyboard to execute the command.
- To cancel a CLI command without entering it, press the Escape key on the terminal keyboard.
- Confirmation of the command occurs when the CLI returns a command prompt without an error message, as in the following example.

  ```
  SystemID> set ds1 24 framing esf

  SystemID>
  ```


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- Errors in a command will produce an error message. The CLI will also mark the location of the first error found in the command with the ^ symbol, as in the following example.

```
SystemID> set ds1 42 framing esf
*-----------------^
*-Number out of range: must be 1..32

SystemID>
```

Text Conventions

Procedures in this manual use the following conventions to represent input commands and output messages.

NOTE: Online help does not display characters in bold or italic.

- Input commands appear in a bold typewriter font, as in the following example.

  set ds1 1-4 up

- If a command requires the operator to enter information, an italic typewriter font is used to show what item or items are required. Each item will be enclosed in < and > symbols, as in the following example. Do not type the < > symbols.

  set ds1 *<n> <setting>*

- If the operator must enter one item from a list, the items will be separated by vertical lines, as in the following example. Do not type the < | > symbols.

  set ds1 *<n> <up|down>*

- System output messages to the operator are printed in normal typewriter font, as in the following response to show the settings for DS1 number 13.

```
show ds1 13

Settings for DS1 13:
     Circuit ID:            AcmeCorp
     Up/Down:               UP
     Framing:               ESF
     Line Coding:           B8ZS
```


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Command Syntax Descriptions

This reference manual uses “side headings” and tables to describe the various CLI commands and how they work. Headings appear immediately to the left of each command or description and are often followed by tables providing additional information.

Name: Provides name of the CLI command

Purpose: Describes purpose of the CLI command

Category: Security, Provisioning, or Maintenance

Security: Level 1 (manager), Level 2 (operator), or Level 3 (monitor)

Syntax: Describes command syntax or structure. This is usually followed by a table describing the allowable field values that can be used in the command. Some commands do not have have additional fields.

Bold type indicates actual commands.

Italic type indicates variables for which the operator must substitute actual values

The < and > symbols are used to enclose settings, as in <*address*>, but are never used when entering commands

Vertical rules are used to separate two or more valid settings, as in <**on**|**off**>

Example: Provides examples of how a complete command would look when typed by the operator.

Message: Provides a sample message produced by the command. This is usually followed by a table describing various items in the message.

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Entering DS1 and DS0 Numbers and Ranges

Commands containing **`show ds1`** *<n>* require the operator to enter a DS1 number (1 to 32) or a range of DS1 numbers. For example, DS1 #6 is entered as **`ds1 6`**. If a DS1 range is specified, the command operations will be applied to all DS1s in the range. To enter a range of DS1s, type the starting and ending numbers, separated by a hyphen. For example, DS1s #1 through #8 can be specified by typing **`ds1 1-8`**.

Commands containing **`show ds0`** *<n:ch>* require the operator to enter both the DS1 number and a DS0 channel number or range of DS0 channel numbers. The DS1 number (1 to 32) and DS0 number (1 to 24) are entered with a colon separating the numbers. For example, the channel list for DS1 #4 and DS0 channel #8 would be entered as **`ds0 4:8`**. The channel list may also contain a range of DS0 channels. For example, DS1 #6 and DS0 channels #1 through #12 would be entered as **`ds0 6:1-12`**. A colon follows the DS1 number, and the beginning and ending DS0 channels are separated by a hyphen.

Command Shortcuts (Tabbing)

"Tabbing" is a shortcut for typing commands. CLI allows the user to enter partial commands and command fragments, then press the Tab key. (Fragments are the first few letters of the command word.) CLI will evaluate what you have typed so far and re-echo the command as it thinks you intend it.

For example, if you type **`stat equip`** or just **`st eq`** and press the Tab key, the CLI will respond with **`status equipment`**. If this is correct, press the Enter or Return key to execute the command. For corrections, use the Backspace, Delete, and Escape keys.

You can "Tab" after typing each fragment or after typing a series of fragments. The CLI will re-echo the command each time you press the Tab key. When you are satisfied that the command is correct, press the Enter or Return key.

Tabbing is context sensitive and smart – it will not substitute a word that does not represent a valid command. CLI will not attempt to correct numbers (such as **`9:1-8`**) or strings enclosed in quotes (such as **`"AcmeCorp"`**).

Keyboard Shortcuts

CLI supports the following keyboard shortcuts.

- **Ctrl F** Forward – displays next command line.
- **Ctrl R** Reverse – displays previous command line.
- **Esc** Escape – cancel CLI command without entering.

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Online Help

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- Displaying Basic Commands ... 18-10
- Context Sensitive Help ... 18-11
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Help System Overview

Online help for CLI commands is available any time you are logged into the Access Navigator. You can display basic commands and obtain context sensitive help with additional detail. You can also print the entire help file to the terminal screen for reference.

Online help describes only those commands available to your access level. The help is updated with each release of the Access Navigator operating system software. If you experience any difficulty with a CLI command, use the online help to display the latest command descriptions and examples.

NOTE: Online help may describe commands that will be rejected because they depend on other conditional command settings. Commands may also be rejected because they require software options not supported by the installed software, in which case the CLI will return the message “That command not supported in this product”.

Displaying Basic Commands

To display a list of basic CLI commands, just type the symbol **?** You can also type the word **help** and press the Enter or Return key on the terminal. The Access Navigator will respond with a message similar to the following, which shows only the first few commands.

```
Command Line Interface Help. For immediate context help type ? at any time.
For command sensitive help, type "help" before any partial command.
Note: Anything listed in brackets <> are variables set by the user.
Commands:
     aco .....................  Activate Alarm Cut Off.
     add .....................  Create interfaces, attributes and users.
     alarms ..................  Displays the active alarms.
     clear ...................  Clears specified information.
     connect .................  Create 2-way connections
                                between DS0s or fractional groups of DS0s.
     delete ..................  Delete items created by add commands.
     disconnect ..............  Remove connection created by connect command.
     exit ....................  Log out of the CLI.
     load ....................  Download software.
     log .....................  Displays the Event Log.
     ping ....................  Send ping request to a remote IP device
                                via the ethernet port.
     print ...................  Print to the screen
```


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Context Sensitive Help

NOTE: Context sensitive help does not work for command words taken out of context. All CLI commands consist of one or more words typed in a specific order. You can obtain help for a partial command only if you type the key command words in sequential order, starting with the first word in the command. For example, in the command word sequence **`set ds1 6 framing esf`**, you can only obtain context sensitive help for the partial commands **`set`**, **`set ds1`**, and **`set ds1 framing.`** Help is not available for the individual words **`ds1`** or **`framing`** or **`esf`**.

Help for a specific CLI command is available either by typing **`help`** before the command word or words in the partial command pressing the Enter or Return key. It is usually easier to type a question mark **`?`** after the partial command (no need to press the Enter or Return key). For example, typing **`set ?`** and pressing the Enter or Return key will produce a message similar to the following.

```
Access Navigator> help set
```

or

```
Access Navigator> set ?
 set ........................  Configure an interface.
    alarms ..................  Manually set an alarm state for testing.
    clock1 ..................  Set the primary
                               master transmit clock source.
    clock2 ..................  Set the secondary
                               master transmit clock source.
    crv .....................  Set CRV call state.
    date ....................  Sets the date in month/day/year.
    ds0 .....................  Setup the specified DS0s of a DS1.
    ds1 .....................  Setup the specified DS1.
    eoc .....................  Setup the EOC interface to the IDT.
    ethernet ................  Set ethernet ip address.
    id ......................  Set the ID.
    ip ......................  Set ip gateway.
    remote ..................  Set remote terminal properties.
    screen ..................  Set/Display CRT screen size in lines.
    snmp ....................  Set the SNMP MIB-II System Group objects.
    switch ..................  Set switch type
    time ....................  Sets the time in hrs:mins:secs
                               Note: use int'l format (24-hour).
    tmc .....................  Setup the TMC interface to the IDT.
    user ....................  Modify attributes for a particular user.

Access Navigator> set
```

NOTE: The partial command will be repeated at the prompt so that you can enter additional command words from the help list. Press the Escape key to cancel the partial command and go back to a blank prompt.

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More details are provided as you type additional words for the partial command. For example, typing **`help set ds1`** and pressing the Enter or Return key will produce a message similar to the following, with more help on setting DS1 parameters.

```
Access Navigator> help set ds1

 set ..................... Configure an interface.
   ds1 ................... Setup the specified DS1.
                           Command syntax: set ds1 <n> <setting>
                           Example: set ds1 1 framing d4
                           The above example sets DS1 #1 to D4 framing.
                           n=DS1 1 to 32 or a range 1-4 (DS1s 1,2,3,4)
                           setting=DS1 setting to apply (see list below)
    clock ................ Set the transmit clock source.
    down ................. Set the DS1 as Out of Service.
    fdl .................. Set the DS1 FDL type.
    framing .............. Set the DS1 framing type.
    id ................... Set the DS1 circuit identification string.
    lbo .................. Set the DS1 line length or line build out.
    line ................. Command a line loopback on the DS1.
    linecode ............. Set the DS1 line coding.
    loopdetect ........... Set detection of FDL loop code.
    payload .............. Command a payload loopback on the DS1.
    type ................. Set the GR-303 usage type for the DS1.
    up ................... Set the DS1 as In Service.
```


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Printing the Help File

NOTE: To disable automatic pausing after each group of screen lines, use the **`set screen off`** command (see "Set Screen" on page 18-127). This will produce a continuous flow of help text that can be captured to the screen buffer or text file.

If desired, you can print the entire help file to the terminal screen by typing **`print help`**. This will produce a message similar to the following, which you can capture and save to disk or print out. If the terminal screen buffer is set up properly, you will be able to scroll up and down through the entire help file. This will allow you to find commands alphabetically, or search the file to find specific commands and words.

Syntax: `print help`

Message:

```
Command Line Interface Help. For immediate context help type ? at any time.
For command sensitive help, type "help" before any partial command.
Note: Anything listed in brackets <> are variables set by the user.

Commands:
   aco ..................... Activate Alarm Cut Off.
                 Command Syntax: aco
   add ..................... Create interfaces, attributes and users.
    interface .............. Create a frame relay or other interface.
                 Command Syntax:
                  add interface <"name"> <ch-list> <type>
                 name = the fractional group name.
                 ch-list = ds1:ch-range
                 ds1 = a ds1 number from 1 to 32
                 ch-range = list of DS0s in the DS1 (1-24)
      data ............... type = data
      gr303 .............. type = gr303
      voice .............. type = voice
    user .................. Create user w/ manager level access.
                 Command Syntax: add user <"name">
                 name = user defined name.
   alarms ................... Displays the active alarms.
                 Command Syntax:
                 alarms <ds1 n|equipment> <major|minor|alert>
                 Example: alarms ds1 1 major
                 The example displays major alarms for DS1 #1.
    alert ................. Display only Alert Alarms
    ds1 ................... Display active alarms for DS1, n=1-32
      alert .............. Display only Alert Alarms for DS1
      major .............. Display only Major Alarms for DS1
      minor .............. Display only Minor Alarms for DS1
    equipment ............. Display only active equipment alarms
      alert .............. Display only Alert Equipment Alarms
      major .............. Display only Major Equipment Alarms
      minor .............. Display only Minor Equipment Alarms
    major ................. Display only Major Alarms
    minor ................. Display only Minor Alarms
   clear .................... Clears specified information.
    log ................... Clears the event log.
```

```
   upload .....................  Save database configuration to a file.
     tftp .....................  Save the database configuration
                                 via tftp to a file.
```


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Users and Passwords

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Administration

The Access Navigator is designed for simple and secure network administration. The Command Line Interface (CLI) provides user names, access levels, and password protection. When logging into the Access Navigator, the CLI will request the user name and password only if needed.

NOTE: To simplify installation, no login is needed for new units. The network administrator can set up password security remotely after installation is complete. Because there must always be at least one Level 1 user, newly added users are automatically assigned manager (Level 1) access. The CLI will send an error message if anyone attempts to delete all Level 1 users when there are still users defined at other levels.

Access Levels

CLI provides three user access levels.

User	Level	Access
Manager	1	Access to all commands. Can add and delete users. There must be at least one Level 1 user.
Operator	2	Access to all commands except adding and deleting users, restoring defaults, uploading and downloading configurations, and sending switch provisioning requests. Can change own password.
Monitor	3	Access limited to displaying reports and status. No access to any commands that could affect system operation.

Typically there is at least one network administrator with manager-level access. Managers have the sole authority to grant others access to the system by adding and deleting user names and passwords.

Operator-level users are typically responsible for the day-to-day operation of the system. Operators have access to all CLI commands, except adding and deleting users, and can provision and test the system.

Monitor-level access permits inexperienced technicians to easily monitor system operation and performance, but prevents them from altering any settings.

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Managing Users

CLI provides the manager with commands to show current users, add and delete users, and set access levels and passwords.

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Who Am I

The **whoami** command shows the name and access level of the user who is logged into the Access Navigator from the current management terminal. It produces a message similar to that shown below.

Syntax: **whoami**

Message:

```
Logged in as user 'alice' (level 1)
```

Show Users

NOTE: Normally a user logs in once to start a management session, then logs off when done (**exit** command). The system allows the same user name to be "logged in" more than once. The total number of simultaneous sessions by all users can not exceed 3, comprising a maximum of 1 RS-232 session and 2 Telnet sessions.

Show current user settings and status with the following command.

Syntax: **show users**

The following is a typical message showing four users. Alice and Bill have level 1 (manager) access. Carl Smith has level 2 (operator) access. And Dave46 has level 3 (monitor) access. The message also gives the current login status and the time and date that each user last logged into the system.

Message:

```
User           Level  Logged in  Last Login
----           -----  ---------  ----------
alice            1       1       09:28:37 11/23/1998
bill             1       2       14:06:25 11/17/1998
carlsmith        2       0       11:17:45 11/22/1998
dave46           3       0       12:14:33 11/20/1998
```


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Description:

Item	Description
User	User names of people with access to the system.
Level	User access level: manager (1), operator (2), monitor (3).
Logged in	Number of active management sessions, 0 to 3.
Last Login	Time and date that user last logged into the system.

Add User

User names can be up to 10 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. Names are not case sensitive. Upper case (capital letters) will be converted to lower case letters before being processed. The name must be enclosed in quotes if it contains spaces..

Add a new user with the following command.

Syntax: **`add user <"name">`**

Example: **`add user "alice"`**

Set User Access Level

NOTE: There must be at least one Level 1 user.

All users have Level 1 access (highest) unless changed to a lower access level.

User	Level	Access
Manager	1	Access to all commands. Can add and delete users. There must be at least one Level 1 user.
Operator	2	Access to all commands except adding and deleting users. Can change own password.
Monitor	3	Access limited to displaying reports and status. No access to any commands that could affect system operation.

Set user access levels with the following command.

Syntax: **`set user <"name"> level`** *`<access>`*

Example: **`set user "alice" level 2`**

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The access settings are as follows.

Access	Definition
1	Set the user to access level 1 (highest).
2	Set the user to access level 2.
3	Set the user to access level 3 (lowest).

Set User Password

Passwords can be up to 10 characters long and may use any combination of letters and numbers. Spaces and special characters are not allowed. Passwords are case sensitive, so that upper and lower case letters are different.

Password protection is optional. If no password is defined for a user, CLI will not require a password to log into the Access Navigator.

Passwords provide an added level of security, while allowing meaningful user names such as Gene or Sam. However, assigning a password only ensures that the user must use it to log into the system the first time. After logging in, any user can change, add, or delete their own password.

Set user passwords with the following command.

Syntax: **`set user <"name"> password`**

Example: **`set user "alice" password`**

The system will prompt you to enter a new password twice for verification. To ensure security, password characters are displayed as asterisks. If no password is entered, none will be required when logging in.

Delete User Password

To delete a user password, so that the user has access without a password, use the **`set user <"name"> password`** command above, but just press the Enter or Return key each time the system prompts you to enter the password.

Delete User

NOTE: Because there must be at least one Level 1 user, the CLI will send an error message if anyone attempts to delete all Level 1 users when there are still users defined at other levels.

Delete old user names with the following command. (The name must be enclosed in quote marks if it contains spaces.)

Syntax: **`delete user <"name">`**

Example: **`delete user "bill"`**

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Logging In and Out

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- <Blue>Login with User Name Required19
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- Login with Password Required ... 18-19
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- Autoexit (CLI Session Timeout) ... 18-20

NOTE: The total number of simultaneous CLI management sessions by all users can not exceed three, comprising a maximum of one RS-232 session and two Telnet sessions. You will remain logged into the Access Navigator until you terminate the session by using the **`exit`** command. An RS-232 session will remain active until terminated. Unplugging the RS-232 management cable will not terminate the session; it will still be active when the cable is plugged in again. If you do not terminate a Telnet session before disconnecting from the Telnet server, the session will remain active for 2 hours. No other users will be able to log on if all Telnet sessions are active. Resetting the Access Navigator will terminate all sessions, but will also disrupt service. To prevent this from happening, you can use the **`autoexit`** command to automatically end the session after a specified period of inactivity.

Startup Message

The CLI management session begins with a startup message similar to the following, which identifies the Carrier Access product and the current time and date.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998
```

Login with No User Name Required

If no users are defined, the CLI will not require a user name to log into the Access Navigator. This was done to simplify hardware installation and initial system setup. A start-up message similar to the following will appear, showing the command prompt. Command prompts always end with the symbol ">". The default command prompt is `Access Navigator>`. The command prompt indicates that the system is waiting for the operator to enter a command.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

SystemID>
```


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Login with User Name Required

If there is at least one user defined, the startup will include a "`Login:`" message similar to the following.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login:
```

To login, type your user name and press the Enter or Return key. User names are not case sensitive. In the following example, the user name is **`smith`**.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login: smith
```

If the user name is incorrect, the "`Login:`" message will be repeated.

Login with No Password Required

If no password is required, the command prompt will appear immediately after entering your user name, as shown below.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login: smith

SystemID>
```

Login with Password Required

When a password is required, a "Password:" message will appear as shown below. This means that you must enter your password and press the Enter or Return key. As you type the password, the CLI will display asterisks. Passwords are case sensitive, so upper and lower case letters are different.

```
Carrier Access Corporation Access Navigator

08:30:45 11/30/1998

Login: smith

Password:******
```

If the password is incorrect, the "`Login:`" message will be repeated.

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Logout (Exit)

When finished with a management session, it is important to log out from the Access Navigator by typing the **`exit`** command. Logging out will maintain network security, ensuring that the next user must log in with a valid user name and password.

With Telnet sessions, logging out is especially important. The Access Navigator can support two simultaneous Telnet sessions for remote management. But if users do not terminate their session with the **`exit`** command, the session will remain active for 2 hours. If both sessions are active, no users will be able to log on. (The 2 hour time-out is standard for TCP/IP networks and can not be changed.)

Autoexit (CLI Session Timeout)

This command adds a settable timeout that can be enabled or disabled for each supported CLI session. The Access Navigator can have up to three active CLI sessions at the same time, one via RS-232 and two via Telnet. When enabled, the CLI session will automatically expire if there is no user activity during the specified time period. This feature enhances system security by ensuring that the session will be closed if the user forgets to log off. To disable the feature and prevent a timeout from occurring, enter zero as the time.

Syntax: **`set autoexit`** *<minutes>*

Field	Description
minutes	Timeout period, 1 to 255 minutes. Enter 0 to disable timeout.

Example: **`set autoexit 60`**

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ACO

Purpose: Alarm Cutoff (ACO) command turns off all alarm relay outputs from the Access Navigator to the facility alarm system. If logged into the Access Navigator, send the **aco** command. The ACO function will be reset if a new alarm event occurs with the same severity (critical, major, minor). Normal operation will resume when all alarms have been cleared.

Security: Level 3 (monitor)

Syntax: **aco**

NOTE: If standing next to the Access Navigator, you can press the ACO pushbutton switch on the Controller displaying the alarm indication. The ACO indicator will light while the alarm relays are cut off.

Add Interface

Purpose: Creates a new fractional interface with a user defined name. A fractional interface is a set of sequential DS0s in the same DS1, such as DS0s 19 through 24. Typical applications include fractional T1 connections for private networks and high-speed data. Use the **delete interface** command to remove an interface and its connections.

NOTE: Crossconnections between DS0s in the Access Navigator (**connect ds0**) must be made before adding a fractional interface (**add interface**) to connect DS0s in the Access Bank II (**connect interface**). This is necessary to prevent connections between incompatible DS0s, such as voice and data.

NOTE: When provisioning the Access Bank II, you must first use the **add interface** command to create a fractional interface, specifying the interface name and the DS0s to be used. Then you can use the **connect interface** command to connect the DS0s to the desired remote Access Bank II voice or data interface. To make an internal crossconnect between the remote T1 Drop and another remote port, use the **add interface** command with the <*type*> set to **remote**.

Each Access Navigator can support up to 64 fractional interfaces. Each DS1 can have several fractional interfaces, but each remote SDSL, RS-232, or V.35 port can have only one fractional interface. A T1 Drop port can have several fractional interfaces to support voice, data, and GR-303 traffic using different DS0s.

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Each remote port has a maximum number of DS0s that can be assigned to the fractional interface.

Remote Port	Maximum Number of DS0s
RS-232	1
SDSL	16
T1 Drop	24
V.35	24

The Access Navigator processes the interface DS0s as voice and data signals. Voice traffic uses robbed bit signaling, while data traffic is clear channel.

Security: Level 2 (operator)

Syntax: **`add interface`** <"*name*"> <*n*:*ch*> <*type*>

Example: **`add interface "AcmeT1" 9:13-18 voice`**

Example: **`add interface "AcmeV35" 10:19-24 data`**

Field	Description
name	A user defined name describing the interface. The name is a text string up to 18 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. The name must be enclosed in quote marks.
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
type	Type of interface. See table below.

Type	Description
data	Data
gr303	GR-303 voice
remote	Remote (See *Connect Remote Interface* on page 18-31)
voice	Voice

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Add User

Purpose: This is a Level 1 command that allows a network manager to add user names for access to the Access Navigator by login on through the Command Line Interface.

Security: Level 1 (manager)

Syntax: **`add user <"name">`**

Field	Description
name	User names can be up to 10 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. Names are not case sensitive. Upper case (capital letters) will be converted to lower case letters before being processed. The name must be enclosed in quotes if it contains spaces.

Example: **`add user "alice"`**

Alarms

Purpose: Allows the user to display all active alarms at once, or just a group of the alarms. Alarms are "events" that do affect, or may affect, service. Adding modifiers to the **`alarms`** command enables the user to display alarms by type and by severity.

Access Navigator alarms have five levels of severity. Only the first three provide front panel indications and alarm relay outputs.

- **CRITICAL** alarms affect service to 128 or more subscribers, with a single failure. There are no critical alarms currently defined for the Access Navigator.
- **MAJOR** alarms affect service to 24 or more subscribers, with a single failure. Since each DS1 (or T1) carries 24 DS0s, the loss of traffic on one or more DS1s will produce a major alarm. A major alarm can be caused by an external event (such as a cut T1 line) or an internal problem (such as a failed T1 card).
- **MINOR** alarms affect service to 2 to 23 subscribers, or reduce service reliability. A minor alarm will occur if a redundant element fails, such as a Controller card, power supply, or GR-303 control channel.
- **WARNING** alarms (GR-303 only) indicate a service state change.
- **ALERT** alarms are non-service affecting, but indicate a quality problem. Alerts will occur when monitored traffic events exceed user-set thresholds.

Security: Level 3 (monitor)

Syntax: **`alarms`**

Displays all alarms.

Syntax: **`alarms <major|minor|alert>`**

Display only those alarms with the specified severity.

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Syntax: **alarms ds1 <*n*|all>**

Displays only DS1 alarms. You can display the alarms for one DS1 number, a range of numbers, or all DS1s.

Syntax: **alarms ds1 <*n*|all> <major|minor|alert>**

Displays DS1 alarms by severity.

Syntax: **alarms equipment**

Displays only equipment alarms by severity.

Syntax: **alarms equipment <major|minor|alert>**

Displays only equipment alarms by severity.

Field	Description
ds1	Display only DS1 alarms
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
all	Display all DS1s
equipment	Display only equipment alarms
major	Display only major alarms
minor	Display only minor alarms
alert	Display only alert alarms

Example: **alarms minor**

Example: **alarms ds1 all**

Example: **alarms ds1 1-10 minor**

Example: **alarms equipment major**

Example: **alarms**

Message:

```
  Time      Date     Severity Description
  ----      ----     -------- -------------------------------
12:54:33 06/01/2001  Minor    TMC Secondary Link Down
12:54:33 06/01/2001  Minor    EOC Secondary Link Down
12:54:32 06/01/2001  Major    DS1 5 Loss of Signal
```

Description:

Item	Description
Time	Time of the event.
Date	Date of the event.

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Item	Description
Severity	Severity of the event (major, minor, alert).
Description	Message describing the event.

Clear BERT Log

Purpose: Erases all data in the BERT log file, which records error counts.

Security: Level 3 (monitor)

Syntax: **`clear bert log`**

Clear Blocked Call Count

Purpose: Sets the blocked call count to zero (see *Status TMC* on page 18-173).

Security: Level 3 (monitor)

Syntax: **`clear blocked call count`**

Clear Config Log

Purpose: Erases all data in the configuration change log file, which records changes to the system configuration for each management interface.

Security: Level 3 (monitor)

Syntax: **`clear config log`**

Clear DS1 Performance

Purpose: Clears only the performance data for the specified Access Navigator DS1, setting all error counters back to zero. This command does not reset the interval timer, so that new errors will only be accumulated for the remainder of the "current" 15 minute interval. This may affect the totals shown for the "previous" 15 minute, 1 hour, and 1 day intervals. The interval timer is only reset by a power-on reset or **`reset all`** command.

Security: Level 3 (monitor)

Syntax: **`clear ds1`** *<n>* **`performance`**

Field	Description
n	DS1 number, 1 to 32

Example: **`clear ds1 9 performance`**

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Clear Log

Purpose: Erases all data in the log file, which records alarm and informational events.

Security: Level 3 (monitor)

Syntax: **`clear log`**

Clear Peak Call Count

Purpose: Sets the peak call count to zero (see *Status TMC* on page 18-173).

Security: Level 3 (monitor)

Syntax: **`clear peak call count`**

Clear Permanent Call Count

Purpose: Sets the permanent call count to zero (see *Status TMC* on page 18-173). After clearing the count, the Access Navigator will recalculate the current number of permanent calls.

Security: Level 3 (monitor)

Syntax: **`clear permanent call count`**

Clear Remote Log

Purpose: Erases all entries in the remote log of the Access Bank II.

Security: Level 3 (monitor)

Syntax: **`clear remote`** *<n>* **`log`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`clear remote 9 log`**

Clear TMC Log

Purpose: Erases all data in the TMC log file, which records the occurrence of blocked calls and permanent calls reported to the GR-303 switch.

Security: Level 3 (monitor)

Syntax: **`clear tmc log`**

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Connect

Purpose: Creates two-way connections between DS0s or fractional groups of DS0s (see Figure 18-2). The two <*n*:*ch*> settings allow you to make connections between individual DS0s or between two ranges of DS0s. Each range must contain an equal number of DS0s.

Crossconnects can be static (nailed up) or dynamic (assigned as needed). Static DCS crossconnects must be set up between voice or data type DS0s. The Access Navigator creates dynamic crossconnects between GR-303 type DS0s on switch DS1s and drop DS1s, as commanded by the central office switch.

The Access Navigator only allows crossconnects between compatible voice, data, and GR-303 types, as shown in Table 18-1. Invalid crossconnects in the table are grayed out.

ISDN BRI is transported using multiple DS0s for the B1, B2, and D channels. The 3DS0 transport mode is set up using digital crossconnections between drop and groom DS1s. GR-303 4:1 TDM transport mode uses a static connection for the D signaling channel between the drop DS1 and the switch DS1, while the bearer B1 and B2 channels are connected to the switch only as needed.

NOTE: When RDT provisioning is enabled at the switch, the switch will automatically configure the ISDN BRI D channel crossconnections when you use the **`send switch provision request`** command. If RDT provisioning is not enabled, you must configure the D channel crossconnections at the Access Navigator.

Security: Level 2 (operator)

Syntax: **`connect`** <*n*:*ch*> <*n*:*ch*>

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.

Example: **`connect 25:19-24 5:1-6`**

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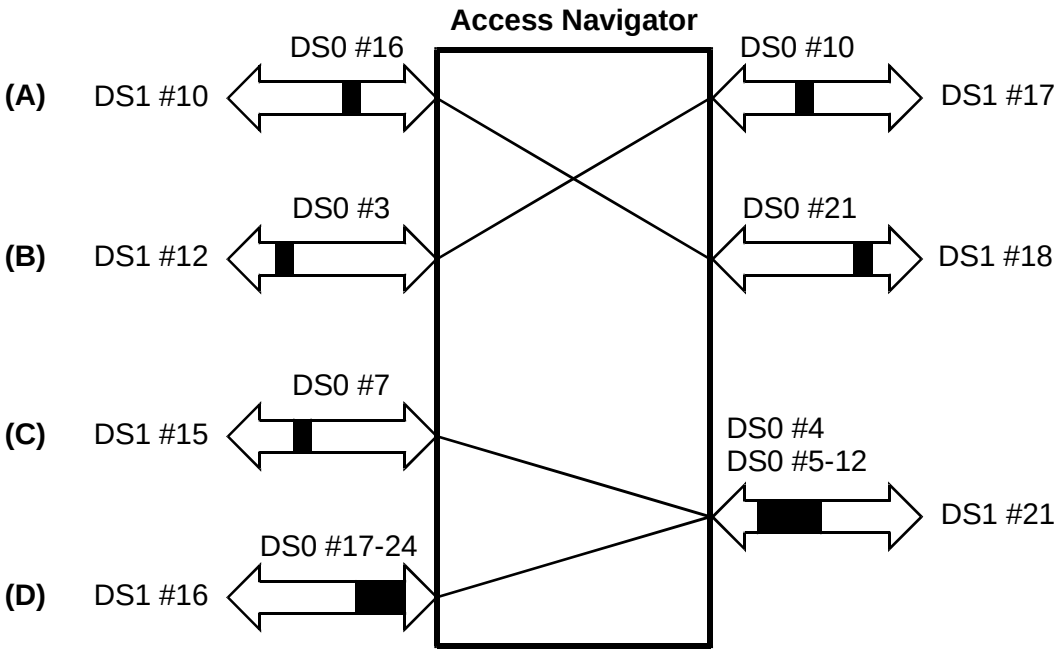

Command Examples: (A) connect ds0 10:16 18:21
(B) connect ds0 12:3 17:10
(C) connect ds0 15:7 21:4
(D) connect ds0 16:17-24 21:5-12

Figure 18-2. Crossconnect Examples

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Table 18-1 Valid Crossconnect Assignments

DS1 Type		Drop			Groom			Switch		
	DS0 Type	Voice	Data	GR-303	Voice	Data	GR-303	Voice	Data	GR-303
Drop	Voice	Valid			Valid					
	Data		Valid			Valid				
	GR-303									Note*
Groom	Voice	Valid			Valid					
	Data		Valid			Valid				
	GR-303									
Switch	Voice									
	Data									
	GR-303			Note*						

*Note: Only ISDN D channels can be statically crossconnected between a switch and drop DS0s.

Connect Remote Interface

Purpose: Connects the DS0s in a fractional interface to a remote Access Bank II voice or data interface (FX, RS-232, T1 Drop, or V.35). This command uses only the name of the fractional interface, which defines the DS0s being connected. Use the **`show interface`** command to display connections (see "Show Interface" on page 18-146).

NOTE: Crossconnections between DS0s in the Access Navigator (**`connect ds0`**) must be made before adding a fractional interface (**`add interface`**) to connect DS0s in the remote Access Bank II (**`connect interface`**). This is necessary to prevent connections between incompatible DS0s, such as voice and data.

The Access Bank II includes crossconnect switches for connecting DS0s between the DS1 drop and the various Access Bank II remote interface ports. These connections are made by using CLI commands to set up crossconnects between a fractional interface and a remote interface.

When provisioning a remote Access Bank II, you must first use the **`add interface`** command to create a fractional interface, specifying the interface name and the DS0s to be used on the Access Navigator's drop DS1 (see *Add Interface* on page 18-23). Then use the **`connect interface`** command to connect the fractional interface DS0s to the desired Access Bank II remote interface port. If the DS0s are currently

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assigned to another remote interface, you must use the **disconnect interface** command before making new connections (see *Disconnect Remote* on page 18-34).

You can use the **show remote connect** command to display the current settings in the Access Navigator data base (see *Show Remote* on page 18-150). After downloading the configuration to the Access Bank II, you can verify those connections by using the **read remote connect** command to read and display the settings from the remote Access Bank II (see *Read Remote Connections* on page 18-48).

Security: Level 2 (operator)

Syntax: **connect remote** <"*name*"> <**fx**|**rs232**|**sdsl**|**t1drop**|**v35**>

Field	Description
name	The user defined name for the fractional interface, as created by the **add interface** command. The name must be enclosed in quotes.
fx	Connect fractional interface from remote FX port to T1 Drop port.
rs232	Connect fractional interface to remote RS-232 interface port.
sdsl	Connect fractional interface to remote SDSL interface port.
t1drop	Connect fractional interface to remote T1 Drop interface port.
v35	Connect fractional interface to remote V.35 interface port.

Example: **connect remote "AcmeT1" t1drop**

Example: **connect remote "AcmeV35" v35**

Delete Interface

Purpose: Removes a fractional interface created by the **add interface** command. It will also disconnect DS0s attached to the interface.

Security: Level 2 (operator)

Syntax: **delete interface** <"*name*">

Field	Description
name	The user defined name for the interface. The name must be enclosed in quotes.

Example: **delete interface "AcmeV35"**

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Delete User

Purpose: This is a Level 1 command that allows a network manager to delete user names and deny access to the Access Navigator by login on through the Command Line Interface.

NOTE: Because there must be at least one Level 1 user, the CLI will send an error message if anyone attempts to delete all Level 1 users when there are still users defined at other levels.

Security: Level 1 (manager)

Syntax: **`delete user <"`***`name`***`">`**

Field	Description
name	User names can be up to 10 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. Names are not case sensitive. Upper case (capital letters) will be converted to lower case letters before being processed. The name must be enclosed in quotes if it contains spaces.. You can display a list of all use names with the command *Show Users* on page 18-155.

Example: **`delete user "bill"`**

Disconnect

Purpose: Removes crossconnects created by the **`connect`** command. To change existing DS0 connections, you must first disconnect them before making new connections.

Security: Level 2 (operator)

Syntax: **`disconnect`** *<n:ch>*

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.

Example: **`disconnect 25:1-24`**

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Disconnect Remote

Purpose: Removes the DS0 connections established by the **`connect remote`** command.

Security: Level 2 (operator)

Syntax: **`disconnect remote`** <"*name*">

Field	Description
name	The user defined name for the fractional interface. The name must be enclosed in quotes.

Example: **`disconnect remote "AcmeV35"`**

Exit

Purpose: Ends management session and logs out the user. When finished with a management session, it is important to log out from the Access Navigator by typing the **`exit`** command. Logging out will maintain network security, ensuring that the next user must log in with a valid user name and password.

Security: Level 3 (monitor)

Syntax: **`exit`**

Exit Remote Session (Ctrl+C)

Purpose: To end a remote CLI management session to an Adit 600 terminal, press the **`Ctrl+C`** keys to cancel the connection to the remote Adit 600 terminal. The Access Navigator prompt will then appear. To start a remote session, see*Logon Remote* on page 18-44.

NOTE: To enter the **`Ctrl+C`** command, hold down the Control (Ctrl) key on the keyboard and press the C key. Some terminal programs must be configured to pass through control codes, rather than intercepting the control codes as commands to the terminal program.

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Load

CAUTION! TO AVOID SERVICE INTERRUPTIONS, FOLLOW PROCEDURE TO *UPDATE CONTROLLER CARD SOFTWARE* ON page 17-1.

NOTE: Always update the standby Controller card, if possible. Then switch the standby card to active, and update the other card.

Updating the active Controller card will disrupt service. All existing crossconnects will be reset. The redundant Controller will not become active. Normal operation will not resume until the update process is complete.

Service disruptions may occur if the software update alters the major functions of the Controller card, such as adding GR-303 features to a DCS card. After performing any major update, it is recommended that the provisioning of all circuits be verified.

Purpose: Updates the Access Navigator operating system software via XModem or TFTP server. The system software is stored in flash memory on each Controller card. This command has two variations, depending on whether the software update file is to be loaded via Xmodem or TFTP.

Security: Level 2 (operator)

Syntax: **`load xmodem <active|standby>`**

Syntax: **`load tftp standby <ipaddr> <"file">`**

Example: **`load xmodem standby`**

Example: **`load tftp standby 192.168.118.65 "00510172.DCS"`**

Field	Description
xmodem	Download software via RS-232 Xmodem protocol. The Controller update software file must be located on a compact disk (CD), hard drive, or file server accessible by the craft terminal or management computer through a file name or path name. File transfers are accomplished using Xmodem protocol, which is supported by most terminal emulation programs, such as Microsoft HyperTerminal. Using an RS-232 management session, the operator sends a **`load xmodem`** command to the Access Navigator. The operator then instructs the terminal program to send the update file. Updating the standby Controller can take up to 30 minutes. Updating the active Controller takes less time, but interrupts service.

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Field	Description
tftp	Download software via Internet TFTP. The Controller update software file must be located on a TFTP file server accessible by both the Telnet management terminal and the Access Navigator. Trivial File Transfer Protocol (TFTP) allows a file to be sent over a network by specifying the server IP address and file name or path name. Using an RS-232 or Telnet management session, the operator sends a **`load tftp`** command to the Access Navigator, specifying the location of the TFTP server and update file. TFTP server capabilities, including time-out settings, must match the bandwidth of the network being used. Depending on the file size and network speed, the file transfer may take several minutes.
active	Upgrade active Controller card.
standby	Upgrade standard Controller card.
ipaddr	IP address where software update file is stored. IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.
file	File name including path used to locate the update software. Carrier Access software file names are shortened for compatibility with PC and UNIX systems. For example, a Carrier Access part number for GR-303 software such as 019-0050 version 1.72 would be shortened to 0050172.303. Similarly, DCS software 019-0051 version 1.72 would be shortened to 00510106.DCS. Software providing different feature options will have different part numbers.

After sending the **`load`** command, the CLI will respond with a series of status messages.

Message:

```
Transmission complete.
Programming flash . . .
Software update succeeded.
```


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Load TFTP Config

CAUTION! CONFIGURATION FILES ARE NOT COMPATIBLE BETWEEN DIFFERENT SOFTWARE VERSIONS (INCLUDING OPTIONS SUCH AS DCS, GR-303, AND P-PHONE). SERVICE DISRUPTIONS CAN OCCUR IF A CONFIGURATION FILE CREATED BY ONE SOFTWARE VERSION IS DOWNLOADED TO AN ACCESS NAVIGATOR RUNNING A DIFFERENT VERSION.

CAUTION! THE ACCESS NAVIGATOR MUST BE RESET AFTER USING THE LOAD CONFIGURATION COMMAND. THIS WILL TEMPORARILY DISRUPT SERVICE (SEE *RESET ALL* ON page 18-57).

NOTE: The **`load config`** command does not alter the IP settings. This feature enables the user to employ the same configuration databases to configure several Access Navigators without changing the IP settings or duplicating IP address on the network.

Purpose: Downloads a file containing configuration database settings into the Access Navigator flash memory on each Controller card. The file transfer normally takes only a few seconds. After downloading the configuration file, a message will appear telling the operator to reset the Access Navigator in order for the settings to take effect.

NOTE: To upload the configuration database from the Access Navigator and save it in file format, see *Upload TFTP Config* on page 18-176.

Security: Level 2 (operator)

Syntax: **`load tftp config`** *`<ipaddr> <"file"> <blocksize>`*

Field	Description
tftp	Download software via Internet TFTP. The configuration database file must be located on a TFTP file server accessible by both the Telnet management terminal and the Access Navigator. Trivial File Transfer Protocol (TFTP) allows a file to be sent over a network by specifying the server IP address and file name or path name. Using an RS-232 or Telnet management session, the operator sends a **`load config`** command to the Access Navigator, specifying the location of the TFTP server and configuration file. TFTP server capabilities, including time-out settings, must match the bandwidth of the network being used.
config	Configuration database.
ipaddr	IP address where configuration file is to be stored. (This is the IP address of the TFTP server.) IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.

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Field	Description
file	File name used to save the configuration data. The file and optional path must be enclosed in quotes, as in "C:\CONFIG\AN26". The default path is the root directory of the TFTP server.
blocksize	Transmission block size (optional), 512 to 8192. The default is 8192 bytes.

Example: **`load tftp config 192.168.118.65 "AN26"`**

Log

Purpose: Displays log events. The Access Navigator maintains a log of the most recent 400 alarms and informational events.The log file will be erased by a power interruption, **`clear log`** command, **`reset`** command, or **`restore defaults`** command. Log records are useful because they show both when an event occurred and when it was cleared. (For a detailed description of these messages, see *Alarm Clearing* on page 14-1.)

NOTE: The Access Navigator will start recording events when first powered up. Consequently, the recorded time and date will start with initial values of 00:00:00 01/01/1998 and will continue until the user sets a new time and date.

Security: Level 3 (monitor)

Syntax: **`log`**

Displays all log events except BERT, TMC and Configuration change events.

Syntax: **`log <major|minor|alert|info>`**

Displays only alarms with a specified severity.

Syntax: **`log ds1`** *<n>*

Displays only DS1 alarms.

Syntax: **`log ds1`** *<n>* **`<major|minor|alert|info>`**

Displays only DS1 alarms with a specified severity level.

Syntax: **`log equipment`**

Displays only equipment alarms.

Syntax: **`log equipment <major|minor|alert|info>`**

Displays only equipment alarms with a specified severity level.

Syntax: **`log info`**

Displays only informational events.

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Field	Description
major	Display only major alarms
minor	Display only minor alarms
alert	Display only alert alarms
info	Display only informational events
bert	Display only BERT events
ds1	Display only DS1 alarms
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
equipment	Display only equipment alarms

Example: **`log ds1 6`**

Example: **`log equipment minor`**

Example: **`log`**

Message:

```
  Time      Date     Severity Description
  ----      ----     -------- -------------------------------
00:33:01 01/01/1998  Info     Transmit Clock using Internal Oscillator
00:22:49 01/01/1998  Clear    DS1 20 Loss Of Signal
00:15:34 01/01/1998  Info     DS1 Card 2 Detected
00:15:29 01/01/1998  Major    DS1 Card 2 Removed While In Service
00:15:09 01/01/1998  Major    DS1 32 Loss Of Signal
00:14:40 01/01/1998  Clear    DS1 2 RAI (Yellow Alarm)
00:14:40 01/01/1998  Clear    DS1 1 RAI (Yellow Alarm)
00:00:10 01/01/1998  Info     Ethernet Link Up
00:00:09 01/01/1998  Info     Transmit Clock using Internal Oscillator
00:00:04 01/01/1998  Info     Controller A Active
00:00:00 01/01/1998  Info     CA-AN System Powerup
```

Description:

Item	Description
Time	Time of the event.
Date	Date of the event.
Severity	Severity of the event (major, minor, alert, info, clear).
Description	Message describing the event.

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Log BERT

Purpose: Displays BERT (bit error rate test) events, which are stored in a BERT log file that holds the most recent 200 error reports. The Access Navigator records BERT events whenever a BER test pattern is present and bit errors occur during any one-second measurement interval. The BERT log file will be erased by a power interruption, **`clear bert log`** command, **`reset`** command, or **`restore defaults`** command.

NOTE: The Access Navigator's internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the bit errors will be recorded in the BERT log.

Security: Level 3 (monitor)

Syntax: **`log bert`**

Message:

```
Time      Date          DS1  FBE    BE     CRC    LCV/BPV
--------  ----------    ---  ------ ------ ------ -------
14:12:15  06/16/2003    31   0      0      1      0
14:12:13  06/16/2003    31   0      0      2      0
14:08:21  06/16/2003    32   0      1      0      0
```

Description:

Item	Description
Time	Time is recorded in one-second intervals. Format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.
Date	Date of error report. Format is month/day/year.
DS1	DS1 on which error occurred, 1 to 32
FBE	Number of Frame Bit Errors (4095 maximum) in one-second interval.
BE	Number of Bit Errors (4095 maximum) in one-second interval
CRC	Number of Cyclical Redundancy Check errors (1023 maximum) in one-second interval
BPV/LCV	Number of Bi-Polar Violations and Line Code Violations (16,383 maximum) in one-second interval

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Log Config

Purpose: Displays configuration log events. The Access Navigator maintains a log of the most recent 500 configuration changes in a separate log file. The log also records the management interface port used to make the changes. The Config log file will be erased by a power interruption, **`clear config log`** command, **`reset`** command, or **`restore defaults`** command.

Security: Level 3 (monitor)

Syntax: **`log config`**

Displays all configuration log events.

Syntax: **`log config ds0`** *<n:ch>*

Displays only the configuration management events affecting a DS0 channel or range of channels.

Syntax: **`log config ds1`** *<n>*

Displays only the configuration management events affecting a DS1 or range of DS1s.

Syntax: **`log config crv`** *<value>*

Displays only the configuration management events affecting a CRV or range of CRVs.

Syntax: **`log config source <cli|eoc|snmp|icc>`**

Displays only the configuration management events from a management interface.

Field	Description
n	DS1 number, 1 to 32
ch	DS0 channel, 1 to 24
value	Call Reference Value, 1 to 768
cli	Command Line Interface using RS-232 port or Telnet Ethernet port.
eoc	Embedded Operations Channel using GR-303 DS1 interface group connected to a switch.
snmp	Simple Network Management Protocol using Ethernet port. (SNMP is used by MIB browsers and other management software.)
icc	Internal Controller Communication. Lists controller events that occurred while this Controller card was in standby.

Example: **`log config ds0 10:5`**

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Example: `log config`

Displays all configuration management events.

Message:

```
  Time      Date      Intf    Description
  ----      ----      ----    -------------------------------
04:00:15 02/09/2000   SNMP    System time changed to 08:02:11
04:00:35 02/09/2000   SNMP    DS1 2 linecode was B8ZS, now AMI
04:00:05 02/09/2000   SNMP    DS1 2 framing was SLC96, now ESF
03:34:17 02/09/2000   CLI     System time changed to 04:00:00
03:32:46 02/09/2000   CLI     1:1 connected to 1:2
03:31:20 02/09/2000   CLI     Switch type was 5ESS, now generic
03:30:44 02/09/2000   CLI     DS1 9 fdl was none, now cac
03:30:24 02/09/2000   CLI     DS1 8 termid was 0, now 5
03:29:54 02/09/2000   CLI     DS0 8:24 type was VOICE, now GR303
03:29:53 02/09/2000   CLI     DS1 8 loopdetect was on, now off
03:26:49 02/09/2000   CLI     DS1 5 lbo was 6, now 8
03:25:37 02/09/2000   CLI     DS1 5 framing was D4, now SLC96
03:25:16 02/09/2000   CLI     DS1 configuration failed
03:24:39 02/09/2000   CLI     DS1 5 linecode was AMI, now B8ZS
03:24:03 02/09/2000   CLI     DS1 3 circuit ID modified
03:22:32 02/09/2000   CLI     DS0 3:4 crv was unassigned, now 55
03:21:57 02/09/2000   CLI     DS0 3:3 signaling was ls, now E&M
03:20:59 02/09/2000   ICC     DS0 2:2 type was GR303, now DATAa
```

Description:

Item	Description
Time	Time of the event.
Date	Date of the event.
Intf	Management interface port: CLI – Command Line Interface using RS-232 port or Telnet Ethernet port. EOC – Embedded Operations Channel using GR-303 DS1 interface group connected to a switch. SNMP – Simple Network Management Protocol using Ethernet port. (SNMP is used by MIB browsers and other management software.) ICC – Internal Controller Communication. The event occurred while this Controller card was in standby.
Description	Message describing the event. Messages normally give previous and current values. A “failed” event indicates that a configuration change was attempted but was rejected because of command or value errors.

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Log TMC

Purpose: Displays TMC (Timeslot Management Control) events, which are stored in a TMC log file that holds the most recent 200 error reports in a separate log file. This log applies only to GR-303 call service. The TMC log file will be erased by a power interruption, **`clear tmc log`** command, **`reset`** command, or **`restore defaults`** command.

Security: Level 3 (monitor)

Syntax: **`log tmc`**

Displays all configuration events.

Syntax: **`log tmc permanent`**

Displays only TMC events for permanent (off-hook) call states.

Syntax: **`log tmc crv`** *<value>*

Displays only CRV events.

Field	Description
value	Call Reference Value, 1 to 768

Example: **`log tmc`**

Message:

```
                        Switch    Drop
 Time     Date    TermID:DS0 DS1:DS0 CRV TMC Event                Cause
 ----     ----    ---------- ------- --- ---------                -----
12:00:19  02/11/2000                     3 Enter perm state
12:00:32  02/11/2000                    32 Exit perm state
12:02:03  02/11/2000                   17 CRV not assigned
11:20:25  02/11/2000    1:23          235 DS1 not type drop
11:20:25  02/11/2000   11:23          235 Drop DS0 not type GR303
11:10:02  02/11/2000             3:12      DS1 not type switch
11:10:02  02/11/2000            30:12      Switch DS0 not type GR303
08:27:53  02/11/2000             5:29      Switch DS1:DS0 OOS
08:52:01  02/11/2000     2:6                  Drop DS1:DS0 OOS
07:01:29  02/10/2000                    27 No disconnect on active CRV
07:01:40  02/10/2000                    47 Off-hook on perm CRV
07:48:20  02/10/2000                   601 Blocked call - REL        15
07:59:02  02/10/2000                    44 Blocked call - DISC        2
10:20:38  02/10/2000                    17 Blocked call - DREQ       17
15:39:30  02/09/2000                    20 No switch response        25
```

Description:

Item	Description
Time	Time of the event.
Date	Date of the event.

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Item	Description
Switch TermID:DS0	Switch terminal identifier, 1 to 28, and DS0 channel, 1 to 24. (TermID is not same as DS1 number.)
Drop DS1:DS0	Drop DS1 number, 1 to 32, and DS0 channel, 1 to 24.
CRV	Call Reference Value, 1 to 768
TMC Event	Message describing the event.
Cause	Numeric value assigned by switch to identify error type.

Logon Remote

Purpose: Starts a remote CLI management session with a Adit 600 TDM terminal connected to a DS1 drop. During an RS-232 or Telnet CLI management session, the user enters the **`logon remote`** command at the Access Navigator prompt. The remote terminal will then respond with a Adit 600 prompt for entering Adit 600 CLI commands. For descriptions of Adit 600 CLI commands, refer to the *Adit 600 TDM User Manual*.

NOTE: To exit from a remote management session, see *Exit Remote Session (Ctrl+C)* on page 18-34.

Security: Level 2 (operator)

Syntax: **`logon remote`** *<n>*

Field	Description
n	DS1 number, 1 to 32.

Example: **`logon remote 12`**

The following example is typical response to the **logon remote** command:

```
Access Navigator> logon remote 3

Remote CLI session attached on ds1 3.
(use <ctrl-c> to end remote CLI session.)
------------------------------------------------------------
```

CLI session with remote goes here.

Session ends when user presses <ctrl-c>.

```
Terminating remote 3 CLI session...
------------------------------------------------------------
Remote CLI session on ds1 3 terminated.

Access Navigator>
```


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Ping

Purpose: Uses "Ping" (an Internet tool) to verify network connections and reachability. The **ping** command uses the Internet Control Message Protocol (ICMP) to request a remote IP device to send back a response. CLI will then display a message showing the result.

Security: Level 3 (monitor)

Syntax: **ping** <*ipaddr*>

Field	Description
ipaddr	IP address which the Access navigator is trying to reach. IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.

Example:
```
ping 192.168.1.14
```

Message:
```
PING 192.168.1.14 : 64 data bytes
Reply from 192.168.1.14: bytes = 64
```

Read Remote Alarms

Purpose: Displays remote Access Bank II alarm status. "Current" indicates if alarms are currently active. "Accumulated" indicates if any alarms have occurred since the last time the alarm status was read. Reading the alarm status clears the accumulated indicator. This command permits the operator to remotely read the actual Access Bank II alarm status through the DS1's CAC FDL management channel. Access Bank II/ SDSL does not have a T1 Drop port. (For performance statistics, see *Read Remote Performance* on page 18-52.)

NOTE: All **read remote** commands require that the remote Access Bank II is operational and connected to an Access Navigator drop DS1 using Carrier Access FDL management protocol. If configuration downloading is enabled, the **read remote** and **show remote** settings should be the same.

Security: Level 3 (monitor)

Syntax: **read remote** <*n*> **alarms**

Field	Description
n	DS1 number, 1 to 32.

Example:
```
read remote 9 alarms
```


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Message:

```
Alarms:
                          Current       Accumulated
                          -------       -----------
 sys power                    off              off
 sys brownout                 off              off
 sys redun                    off              off
 sys reset                    off              off

 v35 rts                      off              off
 v35 llb                      off              off
 v35 v54                      off              off

 t1 (T1#1) carrier            off              off
 t1 (T1#1) csuloop            off              off
 t1 (T1#1) unframed           off              off
 t1 (T1#1) sync               off              off
 t1 (T1#1) yellow             off              off
 t1 (T1#1) bpv                off              off
 t1 (T1#1) ses                off              off
 t1 (T1#1) unavail            off              off
 t1 (T1#1) fdlline            off              off
 t1 (T1#1) fdlpay             off              off

 t1drop (T1#2) carrier        off              off
 t1drop (T1#2) csuloop        off              off
 t1drop (T1#2) unframed       off              off
 t1drop (T1#2) sync           off              off
 t1drop (T1#2) yellow         off              off
 t1drop (T1#2) bpv            off              off
 t1drop (T1#2) ses            off              off
 t1drop (T1#2) unavail        off              off
 t1drop (T1#2) fdlline        off              off
 t1drop (T1#2) fdlpay         off              off
```

Item	Description
Current	Indicates current alarm state
Accumulated	Indicates if any alarms have occurred (accumulated) since the last time the alarm status was read. This flag is cleared (set to “off”) after reading.
off	No alarms occurred
on	One or more alarms occurred
sys power	Hard reset or power-on detected
sys brownout	Low input power (–48 VDC input) detected
sys redun	Redundant T1 switch occurred (This feature is not supported by the Access Navigator)
sys reset	Soft reset detected

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Item	Description
v35 rts	Loss of V.35 Request to Send
v35 llb	Local loopback detected
v35 v54	Remote V.54 loopback detected
t1 (T1#1) carrier	Loss of carrier detected
t1 (T1#1) csuloop	CSU loop code received
t1 (T1#1) unframed	Unframed, all 1's received
t1 (T1#1) sync	Loss of sync
t1 (T1#1) yellow	Yellow alarm received
t1 (T1#1) bpv	Bipolar Violations exceed 1544 in 15-minute interval
t1 (T1#1) ses	Severely Errored Seconds exceed 10 in 15-minute interval
t1 (T1#1) unavail	Unavailable Seconds occurred in 15-minute interval
t1 (T1#1) fdlline	FDL line loopup request received
t1 (T1#1) fdlpay	FDL payload loopup request received
t1drop (T1#2) carrier	Loss of carrier detected
t1drop (T1#2) csuloop	DSU loop code received
t1drop (T1#2) unframed	Unframed, all 1's received
t1drop (T1#2) sync	Loss of sync
t1drop (T1#2) yellow	Yellow alarm received
t1drop (T1#2) bpv	Bipolar Violations exceed 1544 in 15-minute interval
t1drop (T1#2) ses	Severely Errored Seconds exceed 10 in 15-minute interval
t1drop (T1#2) unavail	Unavailable Seconds occurred in 15-minute interval
t1drop (T1#2) fdlline	FDL line loopup request received
t1drop (T1#2) fdlpay	FDL payload loopup request received

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Read Remote Connections

Purpose: Displays crossconnections between interfaces inside the remote Access Bank II, including the T1 connection to the Access Navigator DS1. This command permits the operator to remotely read the actual Access Bank II crossconnect settings through the DS1's CAC FDL management channel.

NOTE: All **`read remote`** commands require that the remote Access Bank II is operational and connected to an Access Navigator drop DS1 using Carrier Access FDL management protocol. If configuration downloading is enabled, the **`read remote`** and **`show remote`** settings should be the same.

NOTE: The **`read remote`** commands show the actual settings of the remote device, while the **`show remote`** commands display the settings stored in the Access Navigator's data base. Both commands should display the same settings when remote configuration is enabled so the Access Navigator can provision the remote Access Bank II.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`connections`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`read remote 9 connections`**

This command produces a message similar to the following. The message shows static connections between each span and channel as a table, where the span is the interface and the channel is the DS0.

NOTE: An Access Navigator DS1 may connect to either T1 port of the Access Bank II. The following message example shows that the Access Navigator DS1 is connected to T1#2 of the Access Bank II, so that T1#1 becomes the T1Drop port. No DS0 channels are currently connected to T1#1.

NOTE: In the Access Bank II/SDSL, the SDSL port replaces T1#2.

Each row and column represents one end of the connection (row is span, column is channel). Note that some spans have two rows of channels, with channels 1 to 12 in the first row and channels 13 to 24 in the second row.

The table entry at the row-column intersection represents the other end of the connection (span:channel). Each interface name in the first column has a span number shown in parentheses. For example, FX#2 (4) means the FX#2 is span number 4, so the entry "4:2" means span 4 channel 2. Table entries with the letters "n/c" have "no connection."

In the message example below, row T1#2 (2) and column CH 13 represent span 2 channel 13. The corresponding table entry is "4:1", which represents span 4 channel 1.

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Therefore, T1#2 channel 13 connects to FX#2 channel 1. Similarly, the entry for row FX#2 and column CH 1 is “2:13”, which indicates a connection to T1#2 channel 13.

Message:

```
Static Connections:

CH       1     2     3     4     5     6     7     8     9     10    11    12
         13    14    15    16    17    18    19    20    21    22    23    24
Span
----    ------------------------------------------------------------------------
T1#1(1)  n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c
         n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c

T1#2(2)  3:1   3:2   3:3   3:4   3:5   3:6   3:7   3:8   3:9   3:10  3:11  3:12
         4:1   4:2   4:3   4:4   4:5   4:6   4:7   4:8   4:9   4:10  4:11  4:12

FX#1(3)  2:1   2:2   2:3   2:4   2:5   2:6   2:7   2:8   2:9   2:10  2:11  2:12

FX#2(4)  2:13  2:14  2:15  2:16  2:17  2:18  2:19  2:20  2:21  2:22  2:23  2:24

V35(5)   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c
         n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c

RS232(6) n/c

Note: #:# = span:channel
      n/c = no connection
```

Description:

Item	Description
CH	Channel numbers in two rows, 1-12 and 13-24.
Span	Interface name (span number). T1#1(1) – T1 interface #1, with up to 24 channels. T1#2(2) – T1 interface #2, with up to 24 channels. SDSL(2) – SDSL interface, with up to 16 channels. FX#1(3) – FX card #1, with up to 12 channels. FX#2(4) – FX card #2, with up to 12 channels. V35(5) – V.35 interface, with up to 24 channels. RS232(6) – RS-232 port, with one channel.

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Read Remote Log

Purpose: Retrieves and displays the log from the remote Access Bank II at the far end of the DS1. The Access Bank II must be operational to read its log. The command displays a message similar to the following. To erase all log entries, use the **`clear remote log`** command. (See "Clear Remote Log" on page 28.)

NOTE: This command only displays the most recent 18 log events. The Access Bank II records the most recent 2048 events in nonvolatile memory, which is protected from power failures. To see the complete log, you will need a direct CLI connection to the unit's RS-232 port.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`log`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`read remote 9 log`**

Message:

```
Event Log:

   Time     Date        Description
   -------- ----------  ------------------------------------------------
 1) 23:21:15 01/04/1996  t1drop (T1#2) - First time Unavailable for a Second
 2) 23:21:14 01/04/1996  t1drop (T1#2) - First time available for a Second
 3) 23:06:15 01/04/1996  t1drop (T1#2) - First time Unavailable for a Second
 4) 23:06:14 01/04/1996  t1drop (T1#2) - First time available for a Second
 5) 22:51:15 01/04/1996  sys           - Remote Monitor Login
 6) 22:51:13 01/04/1996  sys           - V.35 I/F Operational
 7) 22:36:14 01/04/1996  sys           - Codec I/F Operational
 8) 22:36:13 01/04/1996  sys           - T1 Framer I/F Operational
 9) 22:21:14 01/04/1996  sys           - SCC I/F Operational
10) 22:21:13 01/04/1996  sys           - First time available for a Second
11) 22:06:14 01/04/1996  sys           - Memory Good
12) 22:06:14 01/04/1996  sys           - Power Up or Reset
13) 21:52:12 01/04/1996  sys           - Low Power and/or Brown-Out Conditions
14) 21:51:29 01/04/1996  t1     (T1#1) - Yellow Alarm not being received
15) 21:51:28 01/04/1996  t1     (T1#1) - Signal Restored (Carrier Present)
16) 21:51:23 01/04/1996  t1drop (T1#2) - First time Unavailable for a Second
17) 21:51:18 01/04/1996  t1drop (T1#2) - Loss of Framing
18) 21:51:16 01/04/1996  t1     (T1#1) - Received Yellow Alarm
```

NOTE: The Access Bank II has two T1 interfaces, called T1 #1 and #2, or DS1 #1 and #2. The Access Navigator DS1 connects to one T1, and the other may be used as a T1 Drop to customer equipment. In the Access Bank II/SDSL, the SDSL interface replaces T1#2.

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Description:

Item	Description
1) 2) 3) ...	Event number, starting with the most recent.
Time	Time of the event.
Date	Date of the event.
Description	Message describing the event.

Read Remote Loopback

Purpose: Reads and displays the loopback status of the remote terminal on the specified DS1.

NOTE: All **`read remote`** commands require that the remote Access Bank II is operational and connected to an Access Navigator drop DS1 using Carrier Access FDL management protocol.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`loopback`**

Field	Description
n	DS1 number, 1 to 32

Example: **`read remote 9 loopback`**

Message: `Remote Port T1 in Equipment Payload loopup.`

Read Remote RS232

Purpose: Reads and displays the asynchronous RS-232 data port status and settings from the remote Access Bank II at the far end of the Access Navigator's DS1. The first five items are status and the last four are settings. The Access Bank II must be operational to read its settings. The command displays a message similar to the following.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`rs232`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`read remote 9 rs232`**

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Message:

```
RS232:
  Port type:     Subrate
  RTS:           Not Asserted
  DTR:           Not Asserted
  CTS:           Not Asserted
  CD:            Not Asserted
  Stop Bit:      1
  Parity:        none
  Data Bits:     8
  Baud Rate:     9600
```

Description:

Item	Description
Port type	Subrate – asynchronous data port.
RTS	Request to Send: Asserted, Not Asserted.
DTR	Data Terminal Ready: Asserted, Not Asserted.
CTS	Clear to Send: Asserted, Not Asserted.
CD	Carrier Detect: Asserted, Not Asserted.
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600
Data Bits	7, 8
Parity	None, Odd, Even
Stop Bits	1, 2

Read Remote Performance

Purpose: Reads and displays the performance statistics of a remote Access Bank II T1 or T1 Drop at the far end of the DS1. The interval timer in the Access Bank II is only reset by a power-on reset or **`reset remote`** command. Consequently, the performance measurements reflect data collected during the last 0 to 15 minutes of the current 15-minute interval.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`<t1|t1drop> performance`**

Field	Description
n	DS1 number, 1 to 32.
t1	Read T1 performance statistics
t1drop	Read T1 Drop performance statistics

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Example: **`read remote 9 t1 performance`**

Example: **`read remote 9 t1drop performance`**

Message:

```
Current T1DROP (T1#2) Performance Statistics:

      LBS   LOS   AIS   LOF   YEL   UNS   SES    ES   BPV    SS   BES
----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
        0     0     0     0     0     0     0     0     0     0     0
```

NOTE: Detailed descriptions of RFC 1406 performance parameters appear in *Status DS1 Performance* on page 18-162.

Description:

Item	Description
Current...	The remote interface, T1 or T1DROP, and its physical T1 port connection, (T1#1) or (T1#2) on the Access Bank II.
LBS	Loopback Seconds in which unit is in network loopback.
LOS	Loss of Signal (carrier) errors.
AIS	Alarm Indication Signal (Blue) alarms.
LOF	Loss of Frame errors.
YEL	Yellow alarms (Remote Alarm Indication, RAI).
UNS	Unavailable Seconds.
SES	Severely Errored Seconds.
ES	Errored Seconds.
BPV	Bipolar Violations.
SS	Slipped Seconds.
BES	Bursty Errored Seconds.

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Read Remote T1

Purpose: Reads and displays the T1 settings from the remote Access Bank II at the far end of the Access Navigator's DS1. The Access Bank II must be operational to read its settings. The command displays a message similar to the following.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`t1`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`read remote 9 t1`**

Message:

```
T1 (T1#1):
  CSU:       On
  LBO:       CSU (0dB) / DSX-1 (0-133 ft.)
  Linecode:  B8ZS
  Framing:   ESF
  PRM:       ATT
```

Description:

Item	Description
T1 ( )	T1 port connected to Access Navigator: T1 #1, T1 #2
CSU	CSU loop code detection: On, Off
LBO	CSU attenuation (dB), DSX-1 equalization (ft.)
Linecode	AMI, B8ZS
Framing	D4 (SF), ESF
PRM	Performance report message type: ATT – AT&T 54016 maintenance messages. (The ATT setting is required for remote provisioning.)

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Read Remote T1drop

Reads and displays the T1drop settings from the remote Access Bank II at the far end of the Access Navigator's DS1. The Access Bank II must be operational to read its settings. The command displays a message similar to the following.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`t1drop`**

Example: **`read remote 9 t1drop`**

Field	Description
n	DS1 number, 1 to 32.

Message:

```
T1DROP (T1#2):
  CSU:      On
  LBO:      CSU (0dB) / DSX-1 (0-133 ft.)
  Linecode: B8ZS
  Framing:  ESF
  PRM:      ATT
```

Description:

Item	Description
T1 ( )	T1 port connected to customer equipment: T1 #1, T1 #2.
CSU	CSU loop code detection: On, Off.
LBO	CSU attenuation (dB), DSX-1 equalization (ft.).
Linecode	AMI, B8ZS.
Framing	D4 (SF), ESF.
PRM	Performance report message type: ANSI – ANSI T1.403 performance messages. ATT – AT&T 54016 maintenance messages.

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Read Remote V35

Purpose: Reads and displays the V.35 settings from the remote Access Bank II at the far end of the Access Navigator's DS1. The Access Bank II must be operational to read its settings. The command displays a message similar to the following.

Security: Level 3 (monitor)

Syntax: **`read remote`** <*n*> **`v35`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`read remote 9 v35`**

Message:

```
V35:
  datainv:  normal
  clkinv:   none
  cts:      high
  rxclk:    internal
  speed:    nx64
  dsu:      Off
  length:   4
```

Description:

Item	Description
datainv	Data polarity inversion: normal, invert
clkinv	Clock polarity inversion: none, invert
cts	Clear to Send signaling: always high, always low, follow cd, follow rts
rxclock	Receive clock source: internal, external
speed	Data speed (Kbps): Nx56 or Nx64, where N is length (number of DS0s)
dsu	V.54 Data Service Unit (DSU) loopcode detection: on, off
length	Number of DS0s assigned, 0 to 32

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Reset All

CAUTION! THE "RESET ALL" COMMAND WILL INTERRUPT SERVICE FOR ABOUT 30 SECONDS. DCS CROSSCONNECTS WILL BE RESTORED. GR-303 CROSSCONNECTS WILL BE LOST.

Purpose: Produces a soft reset of both Controller cards. It is equivalent to a hard reset, in which the Access Navigator is powered off and on again. The entire process takes about 30 seconds.

Security: Level 2 (operator)

Syntax: **`reset all`**

The **`reset all`** command has the following effects:

- Resets both Controller cards.
- Erases all RAM data, including the GR-303 crossconnects, status, event log, time, and date.
- Does not affect provisioning and other settings stored in flash memory.
- Upon restart, provisioning and other settings are restored.
- Upon restart, the clock starts at time 00:00:00 and date 01/01/1998.
- Upon restart, the status interval timer starts at zero seconds.

Reset DS1 Framer

CAUTION! THE "RESET DS1" COMMAND WILL MOMENTARILY DISRUPT SERVICE WHILE THE DS1 FRAMER RESYNCHRONIZES.

Purpose: Enables the operator to reset one or more DS1 framers. The command resets the DS1 receiver and may be used to test Loss of Frame recovery.

Security: Level 2 (operator)

Syntax: **`reset ds1`** *<n>*

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`reset ds1 9`**

Example: **`reset ds1 5-8`**

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Reset Remote

CAUTION! THE "RESET REMOTE" COMMAND WILL DISRUPT T1 VOICE AND DATA SERVICES THROUGH THE REMOTE ACCESS BANK II FOR ABOUT 15 SECONDS.

Purpose: Resets a remote Access Bank II connected to the Access Navigator through a DS1. This command resets and restores the Access Bank controllers, T1 connection, all crossconnections, and all remote interfaces to the configuration settings stored in nonvolatile memory.

The reset operation takes about 15 seconds, during which all T1 voice and data services through the remote Access Bank II will be disrupted. Management communications with the remote terminal will also be disabled for about 15 seconds (30 seconds for a remote Access Bank II/SNMP).

Security: Level 2 (operator)

Syntax: **`reset remote`** *<n>*

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`reset remote 9`**

Reset Standby

Purpose: Produces a soft reset of the standby Controller card. The entire process takes about 30 seconds. You can use the **`status equipment`** command to verify operational status of the standby Controller card.

Security: Level 2 (operator)

Syntax: **`reset standby`**

The **`reset standby`** command has the following effects:

- Resets only the standby Controller card.
- Does not disrupt service or active Controller operation.
- Upon restart, the standby Controller receives the current database configuration settings and status data from the active Controller.

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Restore Defaults

CAUTION! THE RESTORE COMMAND WILL INTERRUPT SERVICE. ALL CROSSCONNECTS AND SETTINGS WILL BE ERASED AND REPLACED BY FACTORY DEFAULT VALUES.

NOTE: In software release 1.7 and higher, this command will not change the Ethernet configuration, so CLI/Telnet and NetworkValet EMS management sessions will not be affected.

Purpose: This is a Level 1 command that allows a network manager to replace the settings stored in the Controller card's flash memory with the factory default values. However, these values will not take effect until the card is reset, by command or power-up. After entering the **`restore defaults`** command, the CLI will prompt you to enter the **`reset all`** command. (*Reset All* on page 18-57) The **`reset all`** command takes about 30 seconds.

Security: Level 1 (manager)

Syntax: **`restore defaults`**

The **`restore defaults`** command has the following effects:

- Immediately invalidates the current settings, so they will be replaced by factory default values when the card is reset or powered up.
- Upon reset, replaces all settings with factory default values. (For details see Table 18-2.)
- Upon reset, erases all crossconnects, provisioning, and other settings (except the Ethernet configuration).
- Upon reset, erases all RAM data, including the event log, status, statistics, time, and date.
- Upon reset, the clock starts at time 00:00:00 and date 01/01/1998.
- Upon reset, the event log is empty.

s

Table 18-2 Default Settings

Parameter	Default	Comments
DS0 crv	1 to 768	Sequential numbers
DS0 signaling	LS	Loop start (FX)
DS0 type • DCS: Drop DS0 1–32 • GR-303: Drop DS0 1–24 • GR-303: Switch DS0 25–32	 VOICE VOICE GR303	
DS0 up/down	UP	

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Table 18-2 Default Settings (Continued)

Parameter	Default	Comments
DS1 circuit identifier	CA DS1 #*n*	*n* = DS1 number
DS1 clock source	NORMAL	Uses system clock.
DS1 FDL protocol	NONE	Affects FDL out-of-band BOP loop code detection.
DS1 framing	ESF	Required for FDL
DS1 line loopback	DOWN	Disabled
DS1 line coding	B8ZS	Preferred for data
DS1 line buildout	1	DSX-1, 0-133 ft.
DS1 loop code detection	Drop DS1: OFF Groom DS1: ON Switch DS1: ON	Affects CSU in-band loop code detection. Drop side DS1s are normally disabled.
DS1 performance monitoring thresholds	0	Defaults to zero (disabled) for all threshold intervals and parameters
DS1 remote device management	NONE	Used to configure DS0 remote management
DS1 send code	OFF	
DS1 terminal ID • GR-303 only	ds1 25 termid = 1 ds1 26 termid = 3 ds1 27 termid = 4 ds1 28 termid = 5 ds1 29 termid = 2 ds1 30 termid = 6 ds1 31 termid = 7 ds1 32 termid = 8	Ensures GR-303 primary and secondary EOC and TMC are on different Quad DS1 Framer cards for protection.
DS1 type • DCS: DS1 1–32 • GR-303: DS1 1–24 • GR-303: DS1 25–32	 DROP DROP SWITCH	
DS1 up/down	UP	
EOC primary	25:12	Follows DS1 term ID
EOC secondary	29:12	Follows DS1 term ID

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Table 18-2 Default Settings (Continued)

Parameter	Default	Comments
TMC primary	25:24	Follows DS1 term ID
TMC secondary	29:24	Follows DS1 term ID
Remote configuration	ON	No effect unless FDL is set to cac
Remote connections	All voice and GR-303 type DS0s are initially connected to FX card analog lines: Card 1, lines 1-12 Card 2, lines 13-24	DS0 channels are always connected to the corresponding FX line numbers.
Remote identifier	Remote Device #*n*	*n* = DS1 number
Remote T1drop linecode	B8ZS	Preferred for data
Remote T1drop framing	ESF	Required for FDL
Remote T1drop line buildout	1	DSX-1, 0-133 ft.
Remote T1drop PRM	ATT	AT&T 54016
Remote V.35 CTS	HIGH	
Remote V.35 receive clock source	INTERNAL	
Remote V.35 clock inversion	NONE	
Remote V.35 data	NORMAL	No data inversion
Remote RS-232 baud rate	9600	
Remote RS-232 data bits	8	
Remote RS-232 parity	NONE	
Remote RS-232 stop bits	2	

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Send DS1 CSU Loopup

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: For normal operation, the loopback must be disabled (loopdown).

NOTE: This command works with ESF or D4 (SF) framing. This command also works with SLC-96/TR-08 framing for Shelves B, C, D. (For Shelf A, use the command *Send DS1 Line Loopup* on page 18-63.)

Purpose: Sends an *in-band* (bit pattern) line loopup or loopdown code over the Access Navigator DS1. This is called a "CSU" line loopup to avoid confusion with the *out-of-band* (FDL) line loopup described in *Send DS1 Line Loopup* on page 18-63. The CSU loopup is used with other commands and test equipment to verify that the DS1 signal is reaching a far-end Channel Service Unit (CSU), such as the Access Bank II.

CSU loopups can be used with either unframed (line) or framed (payload) patterns and test commands, including *Send DS1 Line <pattern>*, *Send DS1 Line <pattern> Test*, *Send DS1 Payload <pattern>*, and *Send DS1 Payload <pattern> Test*.

When the operator sends the **`csu loopup`** command, the Access Navigator transmits a T1.403 defined in-band line loopback activate code over the drop DS1 to the CSU. After the required 5-second integration time, the CSU should perform a line loopback, which loops the received DS1 frame back to the DS1 transmit output (see Figure 18-3).

When testing is complete, send a **`csu loopdown`** command.

NOTE: This command will send one of the following T1.403 defined code words, repeated for 5 seconds.

Line loopback activate: `00001 00001 ...`
Line loopback deactivate: `001 001 001 ...`

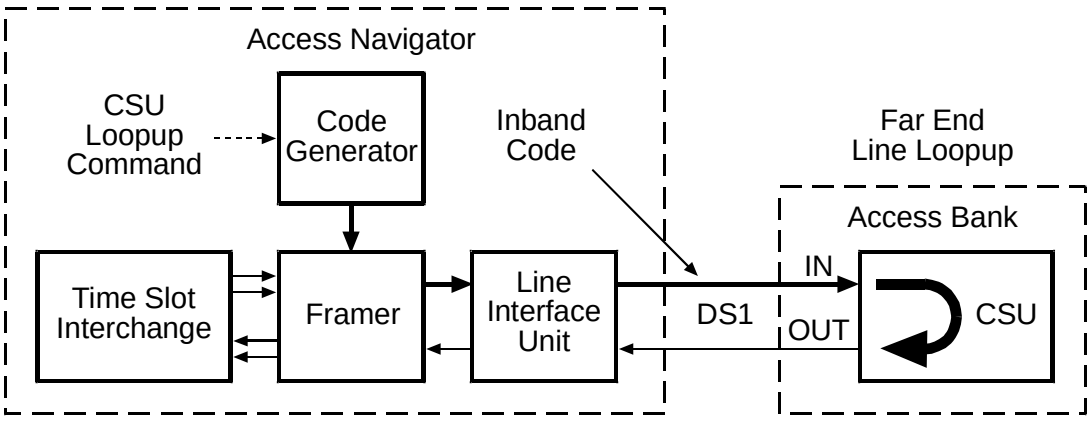

Figure 18-3. Send DS1 CSU Line Loopup

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Security: Level 2 (operator)

Syntax: **`send ds1`** <*n*> **`csu`** <**`loopup`**|**`loopdown`**>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable line loopback.
loopdown	Disable line loopback.

Example: **`send ds1 9 csu loopup`**

Message:
```
Loopup signal sent to remote.
Waiting for confirmation.....loopup confirmed.
```

The above message indicates that the loopup code was sent and that the Access Navigator confirms that the far-end is in loopback. If the message ends with "unable to confirm loopup" there may be a line or equipment problem in the DS1 loop. When testing is finished, always use the loopdown command to return the far-end equipment to normal operation.

Example: **`send ds1 9 csu loopdown`**

Message:
```
Loopdown signal sent to remote.
Waiting for confirmation.....loopdown confirmed.
```

The above message indicates that the loopdown code was sent and that the Access Navigator confirms that no loopback signal is being received from the far-end. If the message ends with "loopup still present" the far-end equipment is still in loopback mode.

If the code can not be sent, the CLI will display an error message, as in the following example.

Message:
```
*- unable to set up ds1 because ds1 is reporting an alarm
condition.
```

Send DS1 Line Loopup

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: For normal operation, the loopback must be disabled (loopdown).

NOTE: This command works with ESF framing and T1.403 FDL, or with SLC-96/TR-08 framing for Shelf A. For Shelves B, C, D, use the command *Send DS1 CSU Loopup* on page 18-62. An Access Bank II using Carrier Access FDL protocol will ignore this command.

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Purpose: Sends an out-of-band (FDL) line loopup or loopdown code over the Access Navigator DS1. It is used with other commands and test equipment to verify that the DS1 signal is reaching far-end CSU equipment, such as the Access Bank.

Line loopups can be used with either unframed (line) or framed (payload) patterns and test commands, including *Send DS1 Line <pattern>*, *Send DS1 Line <pattern> Test*, *Send DS1 Payload <pattern>*, and *Send DS1 Payload <pattern> Test*.

When the operator sends a **`line loopup`** command, the Access Navigator transmits a T1.403 defined out-of-band line loopback activate code over the FDL channel of the drop DS1 to the CSU. After the required 5-second integration time, the CSU should perform a line loopback, which loops the received DS1 frame back to the DS1 transmit output (see Figure 18-4).

When testing is complete, send a **`line loopdown`** command.

NOTE: This command will send one of the following T1.403 defined FDL code words, repeated for 5 seconds.

Line loopback activate: `00001110 11111111`
Line loopback deactivate: `00111000 11111111`

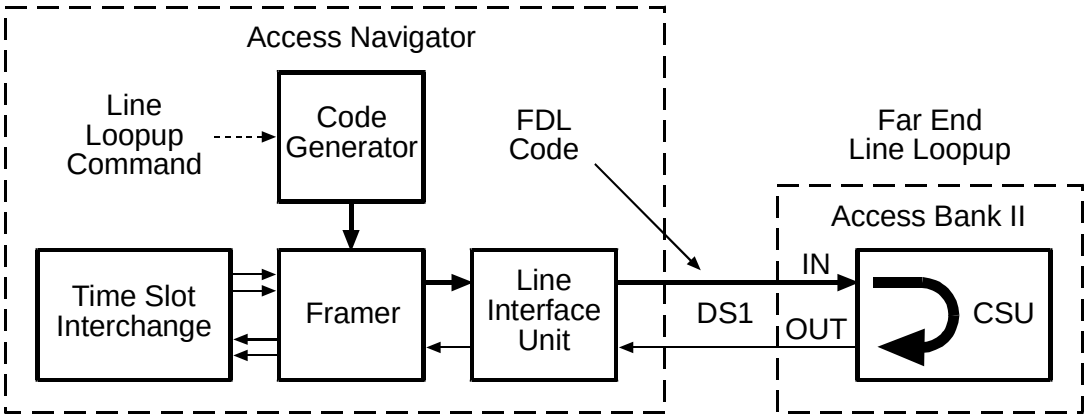

Figure 18-4. Send DS1 Line Loopup

Security: Level 2 (operator)

Syntax: **`send ds1`** <*n*> **`line <loopup|loopdown>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable line loopback.
loopdown	Disable line loopback.

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Example: **`send ds1 9 line loopup`**

Message:
```
Loopup signal sent to remote.
Waiting for confirmation.....loopup confirmed.
```

The above message indicates that the loopup code was sent and that the Access Navigator confirms that the far-end is in loopback. If the message ends with "unable to confirm loopup" there may be a line or equipment problem in the DS1 loop. When testing is finished, always use the loopdown command to return the far-end equipment to normal operation.

Example: **`send ds1 9 line loopdown`**

Message:
```
Loopdown signal sent to remote.
Waiting for confirmation.....loopdown confirmed.
```

The above message indicates that the loopdown code was sent and that the Access Navigator confirms that no loopback signal is being received from the far-end. If the message ends with "loopup still present" the far-end equipment is still in loopback mode.

If the code can not be sent, the CLI will display an error message, as in the following example.

Message: `*- framing for that DS1 does not support code.`

Message:
```
*- unable to set up ds1 because ds1 is reporting an alarm
condition.
```

Send DS1 Line <pattern>

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Sending an unframed pattern will cause a DS1 Loss of Frame (LOF).

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: Put the remote CSU or NIU in line loopback mode before using this command for BER testing. (See *Send DS1 CSU Loopup* and *Send DS1 Network Loopup*.)

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 18-159). Bit errors are also recorded in the BERT log (see *Log BERT* on page 18-40).

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Purpose: Transmits an unframed test pattern to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. The operator can select from several Pseudo Random Bit Sequence (PRBS) and Quasi Random Signal Source (QRSS) patterns.

When the operator commands the selected pattern, the Access Navigator generates and transmits the unframed pattern over the DS1. See Figure 18-5. Sending an unframed pattern will cause a DS1 Loss of Frame (LOF) on both the Access Navigator and the remote CSU.

An external Bit Error Rate Tester (BERT) can be located anywhere on the network or at the customer premises as shown in the figure.

When testing is complete, the **`send ds1 off`** command must be used to turn off the test pattern.

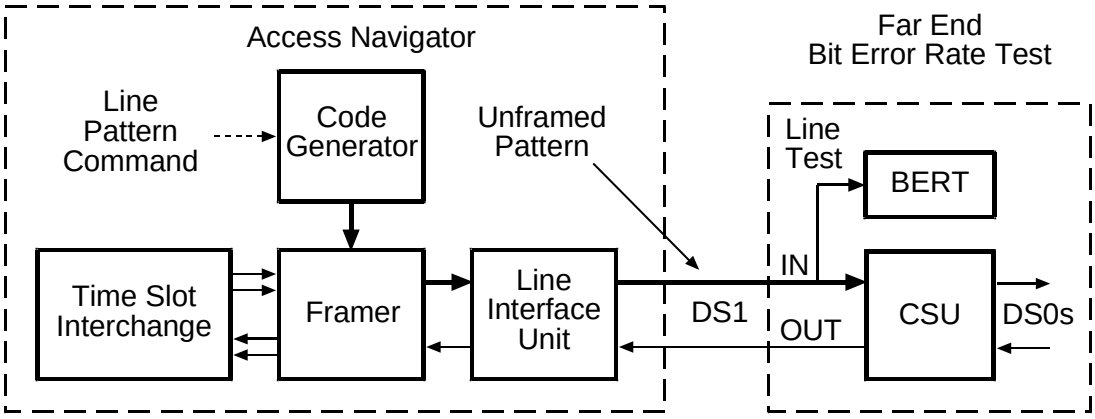

Figure 18-5. Send DS1 Line Pattern

Security: Level 2 (operator)

Syntax: **`send ds1`** <*n*> **`line`** <**`p2e11`**|**`p2e15`**|**`p2e23`**|**`qrss`**>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 215–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)

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Field	Description
qrss	Send QRSS pattern (a modified 220–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`set ds1 9 line p2e15`**

The CLI will provide a progress message indicating the progress of the command, as in the following example:

Message: `Sending pattern. Use 'send ds1 <n> off' to stop.`

Send DS1 Line <pattern> Test

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Sending an unframed pattern will cause a DS1 Loss of Frame (LOF).

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: Put the remote CSU or NIU in line loopback mode before using this command for BER testing. (See *Send DS1 CSU Loopup*, *Send DS1 Network Loopup*, and *Send DS1 NIU Loopup*.)

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 18-159). Bit errors are also recorded in the BERT log (see *Log BERT* on page 18-40).

Purpose: Transmits an unframed test pattern and performs a Bit Error Rate Test (BERT) to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II.

When the operator enters the test command, the Access Navigator generates and transmits the selected PRBS or QRSS test pattern while using its internal Bit Error Rate Tester to measure the bit error rate (see Figure 18-6). Sending an unframed pattern will cause a DS1 Loss of Frame (LOF) on both the Access Navigator and the remote CSU for the duration of the test.

After 10 seconds the pattern is turned off and the test results from the BERT are displayed in a CLI message. (The **`send ds1`** <*n*> **`off`** command is not required to turn off the pattern.)

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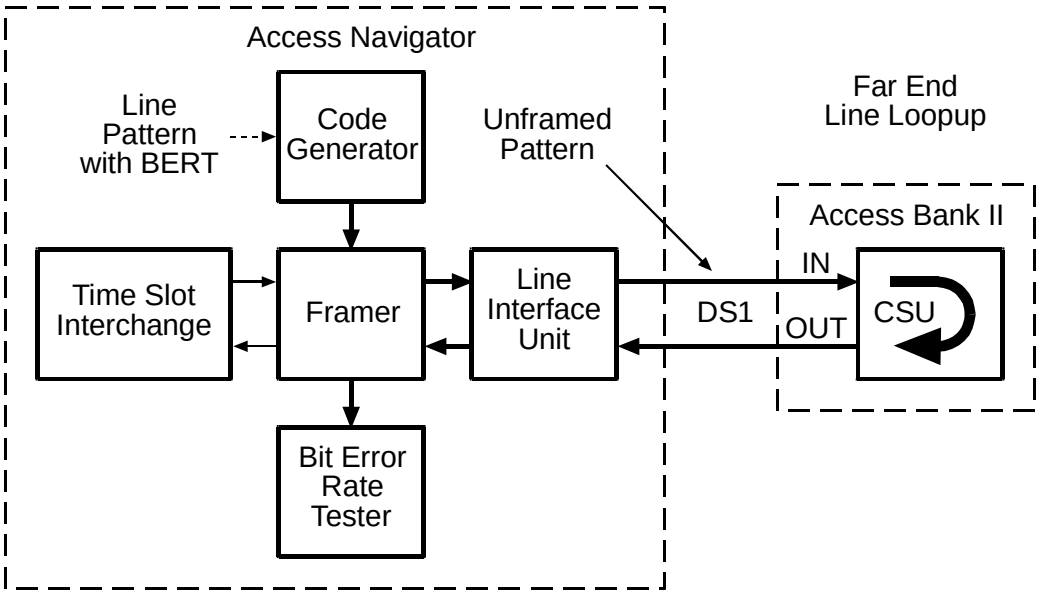

Figure 18-6. Send DS1 Line Pattern with BER Test

Security: Level 2 (operator)

Syntax: **`send ds1 <`***n***`> line <p2e11|p2e15|p2e23|qrss> test`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`set ds1 9 line p2e15 test`**

The CLI will provide a progress message indicating the success (ok) or failure (no sync) of the command, as in the following samples.

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Message:
```
Waiting for pattern sync........ok.
   Testing line...
    08:15:47   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:48   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:49   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:50   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:51   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:52   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:53   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:54   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:55   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:56   FBE:0      BE:0       CRC:0      BPV/LCV:0
               Totals       Error Rates
   FBE:        0            0.000000e+00
   BE:         0            0.000000e+00
   CRC:        0            0.000000e+00
   LCV/BPV:    0            0.000000e+00

   Signaling done.
```

The following error message will occur if an incorrect pattern is received:

Message:
```
Waiting for pattern sync.........no sync.
```

The following error message will occur if there is no loopback in effect:

Message:
```
*-Unable to send code;
*- far-end is not in loopback.
```

Description:

Item	Description
Time	Time is recorded in one-second intervals. Format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.
FBE	Number of Frame Bit Errors (4095 maximum) in one-second interval.
BE	Number of Bit Errors (4095 maximum) in one-second interval
CRC	Number of Cyclical Redundancy Check errors (1023 maximum) in one-second interval
BPV/LCV	Number of Bi-Polar Violations and Line Code Violations (16,383 maximum) in one-second interval
Totals	Total number of errors for 10-second test interval

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Item	Description
Error Rates	Total error rates measured during the 10-second test interval, expressed in scientific notation where "e" indicates a power of 10. For example, 1 error per 1.544 megabits is 6.520000e-07. The maximum value is 2.700000e-03.

Send DS1 Network Loopup

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: For normal operation, the loopback must be disabled (loopdown).

NOTE: This command works with ESF framing.

Purpose: Sends an out-of-band (FDL) loopup or loopdown message over the Access Navigator DS1.The network loopup is used with other commands and test equipment to verify that the DS1 signal is reaching a far-end Network Interface Unit (NIU), such as a "Smart Jack."

Network loopups can be used with either unframed (line) or framed (payload) patterns and test commands, including *Send DS1 Line <pattern>*, *Send DS1 Line <pattern> Test*, *Send DS1 Payload <pattern>*, and *Send DS1 Payload <pattern> Test*.

When the operator sends the **`network loopup`** command, the Access Navigator transmits an FDL message over the drop DS1 to the NIU. After the required 5-second integration time, the NIU should perform a line loopback, which loops the received DS1 frame back to the DS1 transmit output (see Figure 18-7).

When testing is complete, send a **`network loopdown`** command.

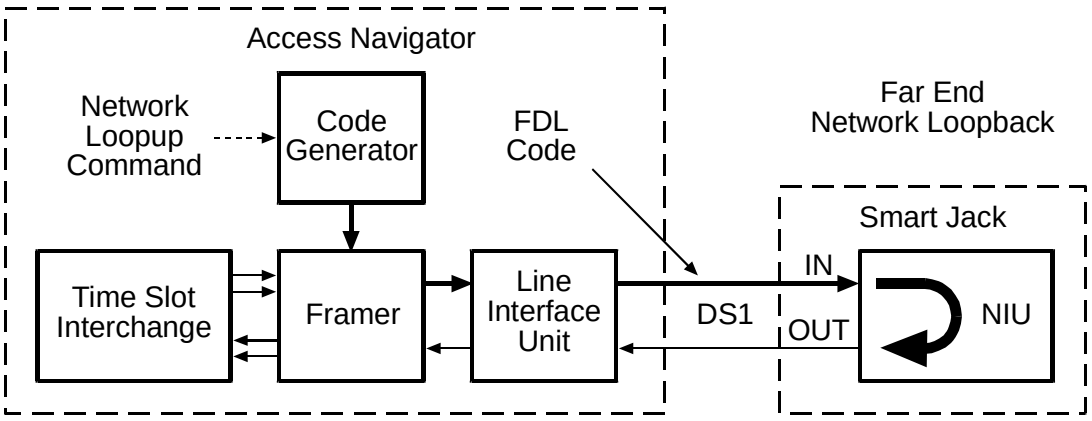

Figure 18-7. Send DS1 Network Loopup

Security: Level 2 (operator)

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Syntax: **`send ds1 <`*`n`*`> network <loopup|loopdown>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable network loopback.
loopdown	Disable network loopback.

Example: **`send ds1 9 network loopup`**

Message:
```
Loopup signal sent to remote.
Waiting for confirmation.....loopup confirmed.
```

The above message indicates that the loopup code was sent and that the Access Navigator confirms that the far-end is in loopback. If the message ends with "unable to confirm loopup" there may be a line or equipment problem in the DS1 loop. When testing is finished, always use the loopdown command to return the far-end equipment to normal operation.

Example: **`send ds1 9 network loopdown`**

Message:
```
Loopdown signal sent to remote.
Waiting for confirmation.....loopdown confirmed.
```

The above message indicates that the loopdown code was sent and that the Access Navigator confirms that no loopback signal is being received from the far-end. If the message ends with "loopup still present" the far-end equipment is still in loopback mode.

If the code can not be sent, the CLI will display an error message, as in the following example.

Message:
```
*- unable to set up ds1 because ds1 is reporting an alarm
condition.
```

Send DS1 NIU Loopup

NOTE: The DS1 must be set Out of Service, using the **`set ds1 <`***`n`***`> down`** command, before you can use loopbacks or test patterns.

NOTE: For normal operation, the loopback must be disabled (loopdown).

NOTE: This command works with ESF or D4 (SF) framing. This command also works with SLC-96/TR-08 framing for Shelves B, C, D. (For Shelf A, use the command *Send DS1 Line Loopup* on page 18-63.)

Purpose: Sends an *in-band* (bit pattern) line loopup or loopdown code over the Access Navigator DS1. The NIU loopup is used with other commands and test equipment to verify that the DS1 signal is reaching a far-end Network Interface Unit (NIU), such as a "Smart Jack."

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NIU loopups can be used with either unframed (line) or framed (payload) patterns and test commands, including *Send DS1 Line <pattern>*, *Send DS1 Line <pattern> Test*, *Send DS1 Payload <pattern>*, and *Send DS1 Payload <pattern> Test*.

When the operator sends the **`niu loopup`** command, the Access Navigator transmits a T1.403 defined in-band NIU line loopback activate code over the drop DS1 to the NIU. After the required 5-second integration time, the NIU should perform a line loopback, which loops the received DS1 frame back to the DS1 transmit output (see Figure 18-8).

When testing is complete, send an **`niu loopdown`** command.

NOTE: This command will send one of the following T1.403 defined code words, repeated for 5 seconds. Telcordia TR-TSY-000312 calls them Facility-2 (FAC2) loopcodes.

NIU loopback activate (FAC2 2-in-5): `00011 00011 ...`
NIU loopback deactivate (FAC2 3-in-5): `00111 00111 ...`

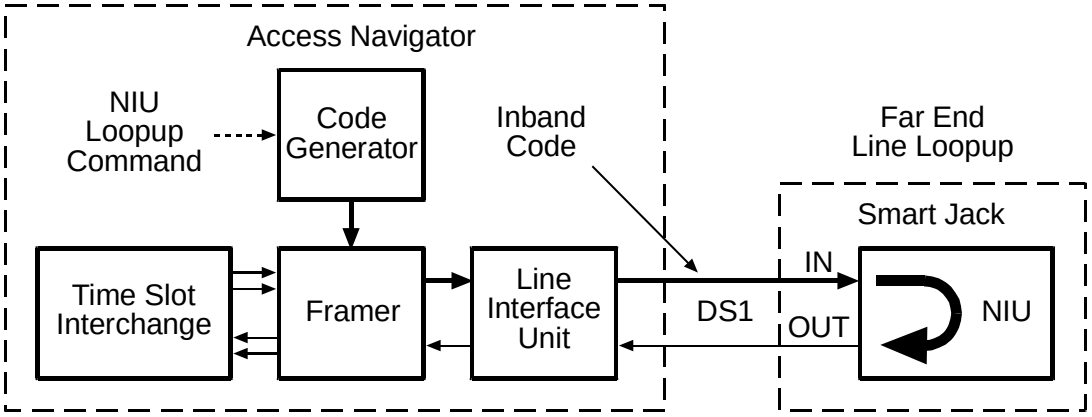

Figure 18-8. Send DS1 NIU Line Loopup

Security: Level 2 (operator)

Syntax: **`send ds1 <`***n***`> niu <loopup|loopdown>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable line loopback.
loopdown	Disable line loopback.

Example: **`send ds1 9 niu loopup`**

Message:
```
Loopup signal sent to remote.
Waiting for confirmation.....loopup confirmed.
```


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The above message indicates that the loopup code was sent and that the Access Navigator confirms that the far-end is in loopback. If the message ends with "unable to confirm loopup" there may be a line or equipment problem in the DS1 loop. When testing is finished, always use the loopdown command to return the far-end equipment to normal operation.

Example: **`send ds1 9 niu loopdown`**

Message:
```
Loopdown signal sent to remote.
Waiting for confirmation.....loopdown confirmed.
```

The above message indicates that the loopdown code was sent and that the Access Navigator confirms that no loopback signal is being received from the far-end. If the message ends with "loopup still present" the far-end equipment is still in loopback mode.

If the loopup or loopdown code can not be sent, the CLI will display an error message, as in the following example.

Message:
```
*- unable to set up ds1 because ds1 is reporting an alarm
condition.
```

Send DS1 Payload Loopup

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Sending an unframed pattern will cause a DS1 Loss of Frame (LOF).

NOTE: For normal operation, the loopback must be disabled (loopdown).

NOTE: This command works with ESF framing and T1.403 FDL, or with SLC-96/TR-08 framing for Shelf A. For Shelves B, C, D, use the command *Send DS1 CSU Loopup* on page 18-62. An Access Bank II using Carrier Access FDL protocol will ignore this command.

Purpose: Sends an out-of-band (FDL) payload loopup or loopdown code over the Access Navigator DS1. It is used with other commands and test equipment to verify that the DS1 signal is reaching far-end CSU equipment, such as the Access Bank II.

Payload loopups can be used with either unframed (line) or framed (payload) patterns and test commands, including *Send DS1 Line <pattern>, Send DS1 Line <pattern> Test, Send DS1 Payload <pattern>*, and *Send DS1 Payload <pattern> Test*.

When the operator sends a **`payload loopup`** command, the Access Navigator transmits a T1.403 defined out-of-band payload loopback activate code over the FDL channel of the drop DS1 to the CSU. After the required 5-second integration time, the CSU should perform a payload loopback, which loops the received DS1 payload back to the DS1 transmit output (see Figure 18-9).

When testing is complete, send a **`payload loopdown`** command.

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NOTE: This command will send one of the following T1.403 defined FDL code words, repeated for 5 seconds.
Payload loopback activate: `00010100 11111111`
Payload loopback deactivate: `00110010 11111111`

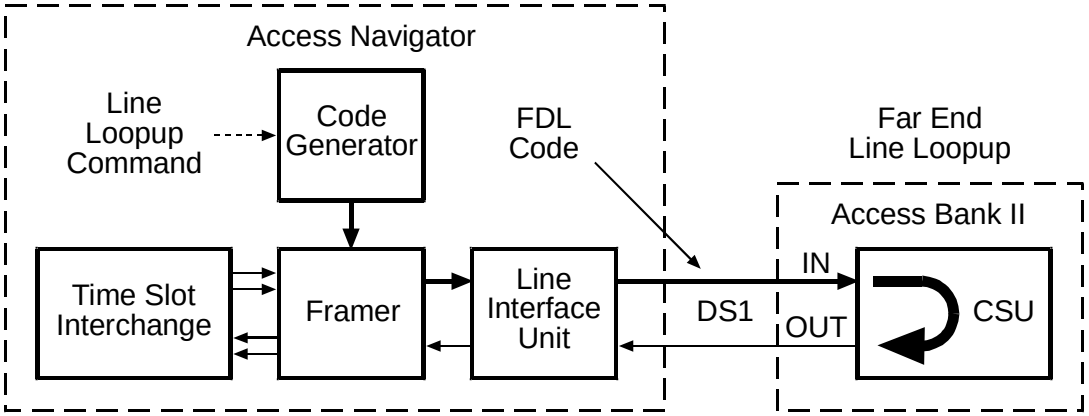

Figure 18-9. Send DS1 Payload Loopup

Security: Level 2 (operator)

Syntax: **`send ds1 <`***n***`> payload <loopup|loopdown>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable payload loopback.
loopdown	Disable payload loopback.

Example: **`send ds1 9 payload loopup`**

Message:
```
Loopup signal sent to remote.
Waiting for confirmation.....loopup confirmed.
```

The above message indicates that the loopup code was sent and that the Access Navigator confirms that the far-end is in loopback. If the message ends with “unable to confirm loopup” there may be a line or equipment problem in the DS1 loop. When testing is finished, always use the loopdown command to return the far-end equipment to normal operation.

Example: **`send ds1 9 payload loopdown`**

Message:
```
Loopdown signal sent to remote.
Waiting for confirmation.....loopdown confirmed.
```

The above message indicates that the loopdown code was sent and that the Access Navigator confirms that no loopback signal is being received from the far-end. If the

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message ends with “loopup still present” the far-end equipment is still in loopback mode.

NOTE: If the code can not be sent, the CLI will display an error message, as in the following examples:

Message: `*- framing for that DS1 does not support code.`

Message: `*- unable to set up ds1 because ds1 is reporting an alarm condition.`

Send DS1 Payload <pattern>

NOTE: The DS1 must be set Out of Service, using the **`set ds1 down`** command, before you can use loopbacks or test patterns.

NOTE: Put the remote CSU or NIU in payload loopback mode before using this command for BER testing. (See *Send DS1 CSU Loopup*, *Send DS1 Network Loopup*., and *Send DS1 Network Loopup*.)

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 18-159). Bit errors are also recorded in the BERT log (see *Log BERT* on page 18-40).

Purpose: Transmits a framed test pattern to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. The operator can select from several pseudo-random test patterns, as well as all-ones and all-zeros.

When the operator commands the selected pattern, the Access Navigator generates and transmits the unframed pattern over the DS1 (see Figure 18-10).

An external Bit Error Rate Tester (BERT) can be located anywhere on the network or at the customer premises as shown in the figure.

When testing is complete, the **`send ds1`** <*n*> **`off`** command must be used to turn off the test pattern.

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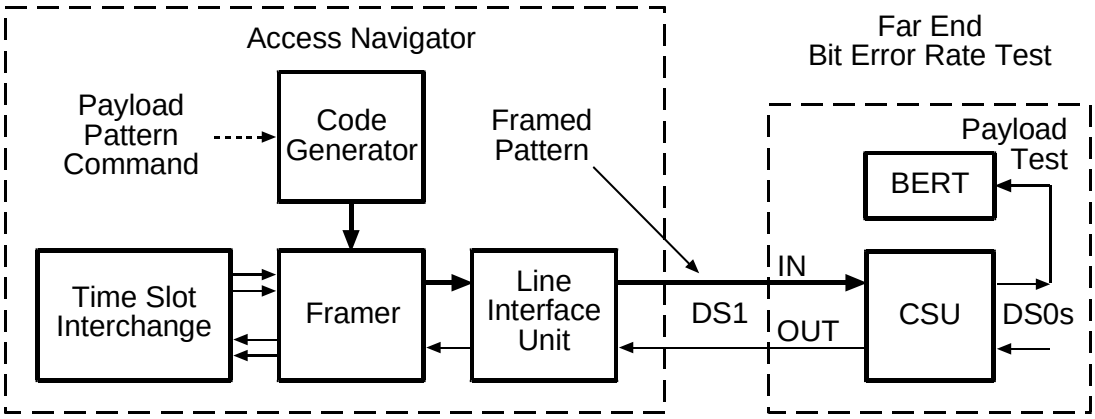

Figure 18-10. Send DS1 Payload Pattern

Security: Level 2 (operator)

Syntax: **`send ds1`** *<n>* **`payload`**
`<allones|allzeros|f1in8|p2e11|p2e15|p2e23|qrss>`

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
allones	Send framed all-ones pattern. This can be used as a "keep alive" signal, idle code, and in measuring the T1 power level.
allzeros	Send framed all-zeros pattern. This can be used to test T1 circuits for B8ZS clear channel capability and to find equipment incorrectly set to AMI line code. Note: When using an all-zeros pattern, a T1 test set (such as a T-Berd 224 or Sunset T3) must be used to monitor for errors in the all-zeros pattern from the Access Navigator or looped back from a far-end network element.
f1in8	Send framed 1-in-8 pattern (also called a 1-and-7 pattern) in which each payload byte contains the bit pattern 01000000. (Minimal ones density test for T1 circuits with AMI coding.)
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)

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Field	Description
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`send ds1 9 payload p2e15`**

The CLI will provide a progress message indicating the progress of the command, as in the following samples.

Message: `Sending pattern. Use 'send ds1 <n> off' to stop.`

Example:
```
set ds1 9 down
send ds1 9 csu loopup
send ds1 9 payload allzeros
(monitor test set for errors)
send ds1 9 off
send ds1 9 csu loopdown
set ds1 9 up
```

The above example uses the all-zeros pattern and a test set to check for B8ZS clear channel capability and to find equipment incorrectly set to AMI line code.

Send DS1 Payload <pattern> Test

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: Put the remote CSU in payload loopback mode before using this command for BER testing. (See *Send DS1 CSU Loopup* on page 18-62.)

NOTE: This command works with ESF and D4 (SF) framing.

NOTE: The p2e patterns are intended only for Access Navigator loop tests and for tests between two Access Navigators. Other test equipment will not recognize these patterns.

NOTE: The internal Bit Error Rate Testers (BERTs) are always monitoring the DS1 inputs. Anytime a BER test pattern is present, whether internally or externally generated, the BER for the last one-second interval can be displayed using the **`status ds1`** command (see *Status DS1* on page 18-159). Bit errors are also recorded in the BERT log (see “Log BERT” on page 18-40).

Purpose: Transmits a framed test pattern and performs a Bit Error Rate Test (BERT) or pattern synchronization test to verify the quality of the DS1 signal reaching far-end CSU equipment, such as the Access Bank II. When the operator requests a p2e, qrss, or all-ones test pattern, the Access Navigator transmits the test pattern while using its internal Bit Error Rate Tester to measure the bit error rate. See Figure 18-11. For the all-zeros and 1-in-8 patterns, the Access Navigator tests for pattern synchronization.

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After 10 seconds the pattern is turned off and the test results from the BERT are displayed in a CLI message. (The **`send ds1`** <*n*> **`off`** command is not required to turn off the pattern.)

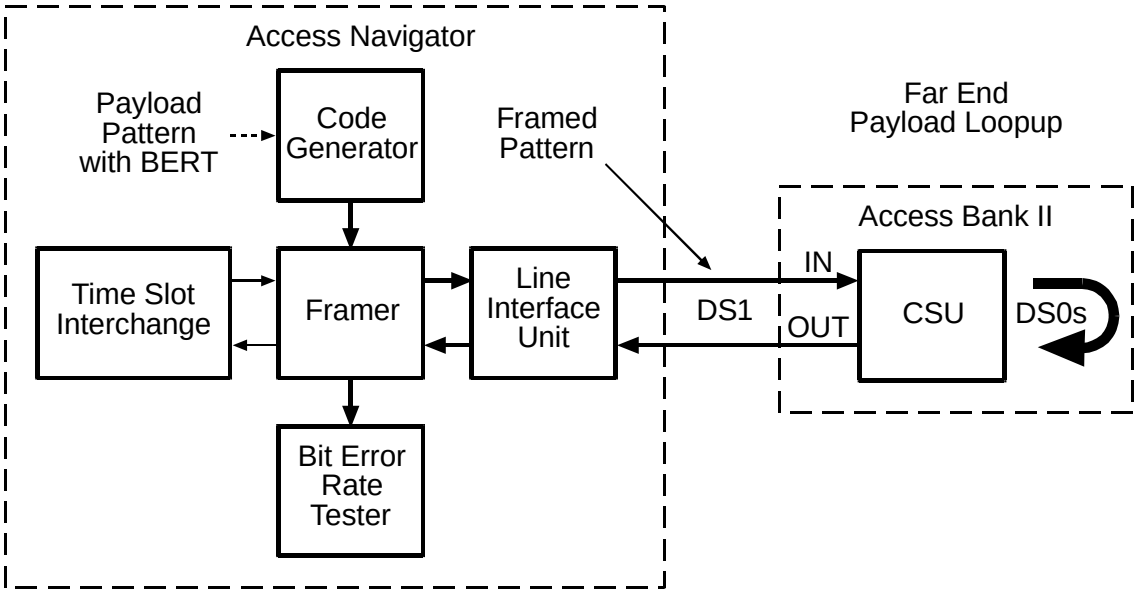

Figure 18-11. Send DS1 Payload Pattern with BER Test

Security: Level 2 (operator)

Syntax: **`send ds1`** <*n*> **`payload`**
`<allones|allzeros|f1in8|p2e11|p2e15|p2e23|qrss> test`

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
allones	Send framed all-ones pattern. This can be used as a “keep alive” signal, idle code, and in measuring the T1 power level.
allzeros	Send framed all-zeros pattern. This can be used to test T1 circuits for B8ZS clear channel capability and to find equipment incorrectly set to AMI line code. Note: When using an all-zeros pattern, a T1 test set (such as a T-Berd 224 or Sunset T3) must be used to monitor for errors in the all-zeros pattern from the Access Navigator or looped back from a far-end network element.
f1in8	Send framed 1-in-8 pattern (also called a 1-and-7 pattern) in which each payload byte contains the bit pattern 01000000. (Minimal ones density test for T1 circuits with AMI coding.)

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Field	Description
p2e11	Send 2^{11}–1 pattern with a maximum of 10 consecutive zeros and 11 consecutive ones. (Minimum stress testing.)
p2e15	Send 2^{15}–1 pattern with a maximum of 14 consecutive zeros and 15 consecutive ones. (Provides maximum number of consecutive zeros permissible in framed, non-B8ZS testing.)
p2e23	Send 2^{23}–1 pattern with a maximum of 22 consecutive zeros and 23 consecutive ones. (Maximum stress testing.)
qrss	Send QRSS pattern (a modified 2^{20}–1) with a maximum of 14 consecutive zeros and 20 consecutive ones. (Common stress test for T1 data applications.)

Example: **`set ds1 9 payload p2e15 test`**

For p2e, qrss, and all-ones test patterns, the CLI will provide a progress message indicating the success (ok) or failure of the command followed by the bit error test results, as in the following sample.

Message:
```
Waiting for pattern sync........ok.
   Testing line...
    08:15:47   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:48   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:49   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:50   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:51   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:52   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:54   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:55   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:56   FBE:0      BE:0       CRC:0      BPV/LCV:0
    08:15:57   FBE:0      BE:0       CRC:0      BPV/LCV:0
               Totals       Error Rates
   FBE:        0            0.000000e+00
   BE:         0            0.000000e+00
   CRC:        0            0.000000e+00
   LCV/BPV:    0            0.000000e+00

   Signaling done.
```

The following error message will occur if an incorrect pattern is received:

Message:
```
Waiting for pattern sync........no sync.
```

The following error message will occur if there is no loopback in effect:

Message:
```
*-Unable to send code;
*- far-end is not in loopback.
```


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Example: **`send ds1 9 payload f1in8 test`**

For the 1-in-8 and all-zeros patterns, the CLI will provide a progress message indicating the success (ok) or failure of the command, followed by a pattern detection message for each second of the test.

Message:

```
Waiting for pattern sync........ok.
   Testing line...
    08:18:23   Pattern Not Present
    08:18:24   Pattern Present
    08:18:25   Pattern Present
    08:18:26   Pattern Present
    08:18:27   Pattern Present
    08:18:28   Pattern Present
    08:18:29   Pattern Present
    08:18:30   Pattern Present
    08:18:31   Pattern Present
    08:18:32   Pattern Present

   Signaling done.
```

Description:

Item	Description
Time	Time is recorded in one-second intervals. Format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10.
FBE	Number of Frame Bit Errors (4095 maximum) in one-second interval
BE	Number of Bit Errors (4095 maximum) in one-second interval
CRC	Number of Cyclical Redundancy Check errors (1023 maximum) in one-second interval
BPV/LCV	Number of Bi-Polar Violations and Line Code Violations (16,383 maximum) in one-second interval
Totals	Total number of errors for 10-second test interval
Error Rates	Total error rates measured during the 10-second test interval, expressed in scientific notation where "e" indicates a power of 10. For example, 1 error per 1.544 megabits is 6.520000e-07. The maximum value is 2.700000e-03.

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Send DS1 Off

Purpose: Stops (turns off) all **qrss** and **prbs** test patterns from the Access Navigator. This is the default state of the system.

Security: Level 2 (operator)

Syntax: **send ds1** <*n*> **off**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8,

Example: **send ds1 9 off**

Send Remote Loopdown

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1 to loopdown all the remote Access Bank II interfaces. This command is used to disable the following **send remote loopup** commands:

- Send Remote RS232 Line Loopup ... 18-82
- Send Remote RS232 TSI Loopup ... 18-83
- Send Remote SDSL Payload Loopup ... 18-84
- Send Remote T1 Payload Loopup ... 18-85
- Send Remote T1 TSI Loopup ... 18-86
- Send Remote T1Drop Line Loopup ... 18-88
- Send Remote T1Drop Payload Loopup ... 18-89
- Send Remote T1Drop TSI Loopup ... 18-90
- Send Remote V35 Line Loopup ... 18-91
- Send Remote V35 TSI Loopup ... 18-93

NOTE: To check remote loopback status, use the **read remote loopback** command. See *Read Remote Loopback* on page 18-51.

Security: Level 2 (operator)

Syntax: **send remote** <*n*> **loopdown**

Field	Description
n	DS1 number, 1 to 32

Example: **send remote 9 loopdown**

Message: `Loop command sent to remote.`

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Send Remote RS232 Line Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify RS-232 signal processing.

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the CAC FDL channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote rs232 line loopup`** command should cause the remote Access Bank II to perform a line loopback in the RS-232 interface. This takes the received RS-232 data signal, loops it back in the RS-232 interface, and sends it back to the RS-232 output (see Figure 18-13). To loopdown the interface, use the **send remote loopdown** command.

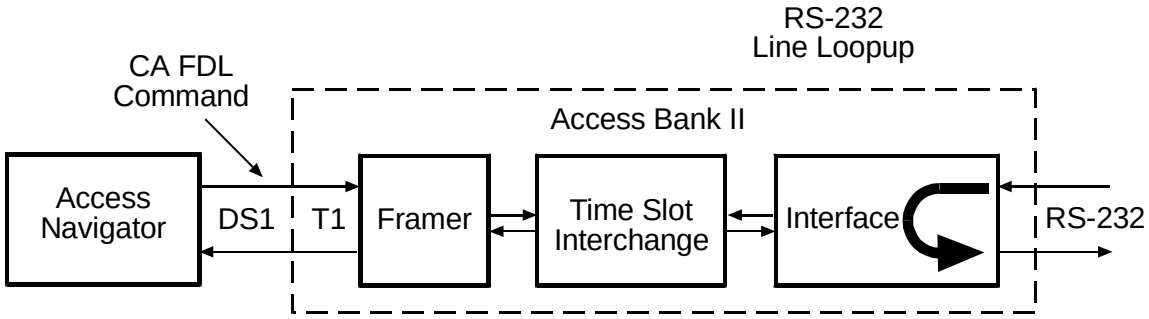

Figure 18-12. Remote RS-232 Line Loopup

Security: Level 2 (operator)

Syntax: **`send remote`** *<n>* **`rs232 line loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 rs232 line loopup`**

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Message: `Loop command sent to remote.`

Send Remote RS232 TSI Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify RS-232 signal processing.

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote rs232 tsi network loopup`** command should cause the remote Access Bank II to perform a network loopback on the RS-232 data. This takes the received RS-232 DS0 from the network T1, loops it in the Time Slot Interchange (TSI), and sends it back to the T1 output (see Figure 18-13).

The **`send remote rs232 tsi equipment loopup`** command should cause the remote Access Bank II to perform an equipment loopback on the RS-232 signal. This takes the received DS0 from the RS-232 equipment interface, loops it in the Time Slot Interchange (TSI), and sends it back to the RS-232 output (see Figure 18-14). To loopdown the interface, use the **send remote loopdown** command.

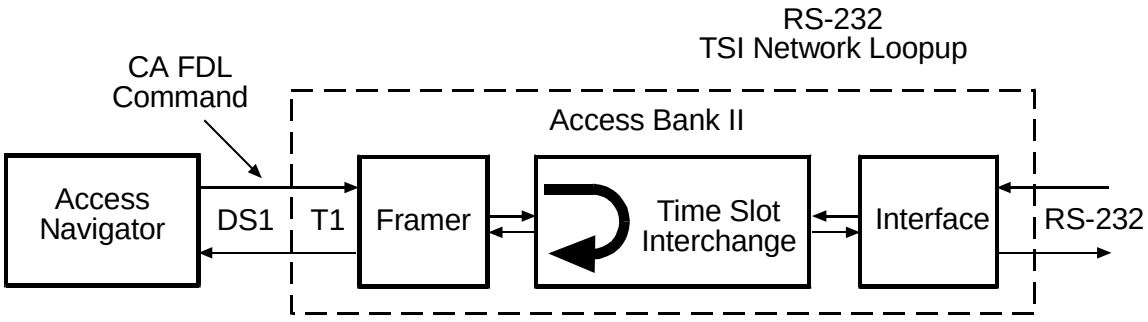

Figure 18-13. Remote RS-232 TSI Network Loopup

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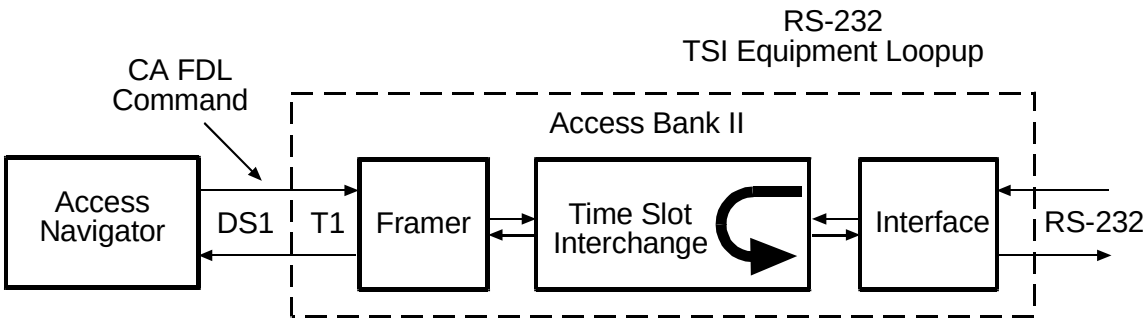

Figure 18-14. Remote RS-232 TSI Equipment Loopup

Security: Level 2 (operator)

Syntax: **`send remote <n> rs232 tsi <equipment|network> loopup`**

Field	Description
n	DS1 number, 1 to 32.
equipment	Loopup the equipment side
network	Loopup the network side

Example: **`send remote 9 rs232 tsi equipment loopup`**

Example: **`send remote 9 rs232 tsi network loopup`**

Message: `Loop command sent to remote.`

Send Remote SDSL Payload Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify SDSL signal processing.

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When the operator enters a **send remote** command, the Access Navigator transmits a message over the Carrier Access FDL channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **send remote** <*n*> **sdsl payload loopup** command should cause the remote Access Bank II to perform a payload loopback on the SDSL data from both network and equipment sides. On the network side, this takes the received SDSL DS0s from the T1, loops it in the SDSL interface, and sends them back through the Time Slot Interchange (TSI) to the T1 output (see Figure 18-15). On the equipment side, this takes the received data from the SDSL equipment, loops it in the SDSL interface, and sends it back to the SDSL output. To loopdown the interface, use the **send remote loopdown** command.

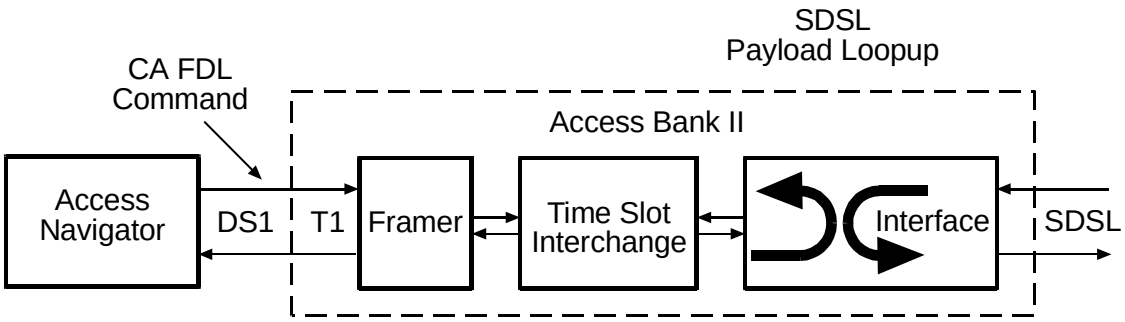

Figure 18-15. Remote SDSL Payload Loopup

Security: Level 2 (operator)

Syntax: **send remote** <*n*> **sdsl payload loopup**

Field	Description
n	DS1 number, 1 to 32

Example: **send remote 9 sdsl payload loopup**

Message: `Loop command sent to remote.`

Send Remote T1 Payload Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **send remote loopdown** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

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NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify T1 signal processing in the Access Bank II. Payload loopbacks can be used with unframed PRBS and QRSS test patterns (see *Send DS1 Payload <pattern>* on page 18-75 and *Send DS1 Payload <pattern> Test* on page 18-77).

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote t1 payload loopup`** command should cause the remote Access Bank II to perform a payload loopback. This takes the received DS0s from the T1, loops them in the framer, and sends them back to the T1 output (see Figure 18-16). To loopdown the interface, use the **send remote loopdown** command.

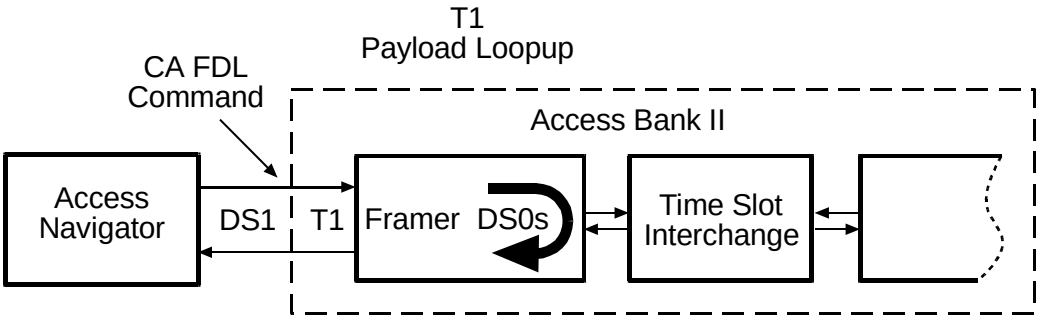

Figure 18-16. Remote T1 Payload Loopup

Security: Level 2 (operator)

Syntax: **`send remote <n> t1 payload loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 t1 payload loopup`**

Message: `Loop command sent to remote.`

Send Remote T1 TSI Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **send**

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`remote loopdown` command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify T1 signal processing in the Access Bank II. Payload loopbacks can be used with unframed PRBS and QRSS test patterns (see *Send DS1 Payload <pattern>* on page 18-75 and *Send DS1 Payload <pattern> Test* on page 18-77).

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote`** <*n*> **`t1 tsi loopup`** command should cause the remote Access Bank II to perform a Time Slot Interchange (TSI) loopback. This takes the received DS0 data, loops it in the TSI, and sends it back to the T1 output (see Figure 18-17). To loopdown the interface, use the **send remote loopdown** command.

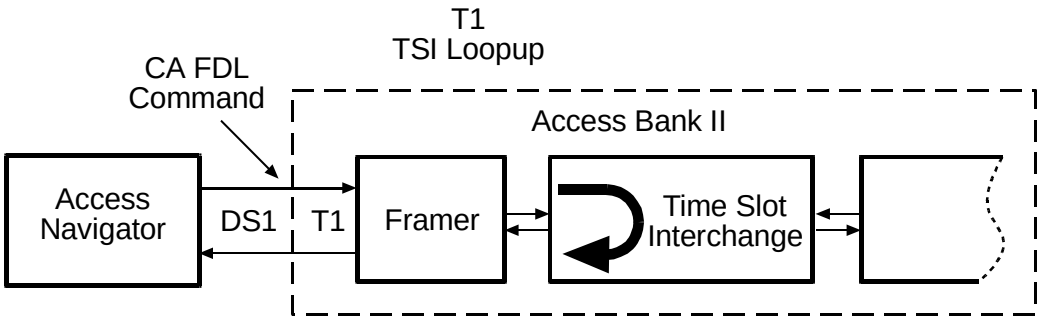

Figure 18-17. Remote T1 TSI Loopup

Security: Level 2 (operator)

Syntax: **`send remote`** <*n*> **`t1 tsi loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 t1 tsi loopup`**

Message: `Loop command sent to remote.`

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Send Remote T1Drop Line Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **send remote loopdown** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **read remote loopback** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify T1 Drop signal processing.

When the operator enters a **send remote** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **send remote t1drop line loopup** command should cause the remote Access Bank II to perform a line loopback on the T1 Drop output. This takes the received T1 Drop DS1 signal, loops it in the framer, and sends it back to the T1 Drop output (see Figure 18-18). To loopdown the interface, use the **send remote loopdown** command.

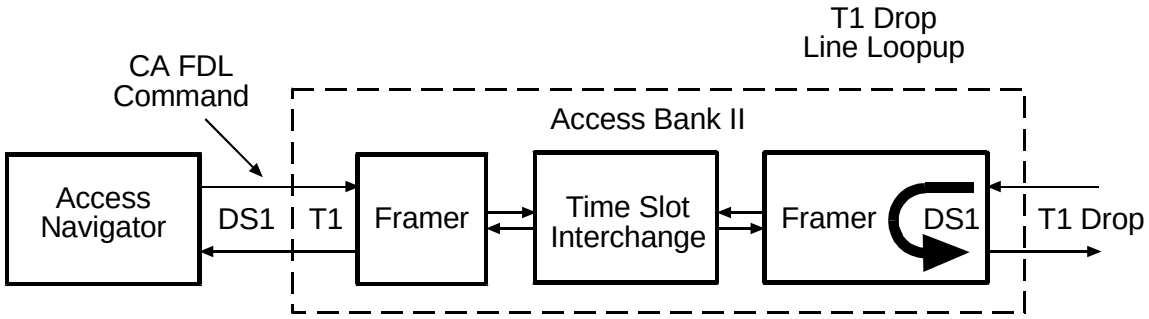

Figure 18-18. Remote T1drop Line Loopup

Security: Level 2 (operator)

Syntax: **send remote** <*n*> **t1drop line loopup**

Field	Description
n	DS1 number, 1 to 32

Example: **send remote 9 t1drop line loopup**

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Message: `Loop command sent to remote.`

Send Remote T1Drop Payload Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify T1 Drop signal processing.

When the operator enters a send **`remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The send **`remote t1drop payload loopup`** command should cause the remote Access Bank II to perform a payload loopback on the T1 Drop interface. This takes the received T1 Drop DS0s, loops them in the framer, and sends them back to the T1 Drop output (see Figure 18-19). To loopdown the interface, use the **send remote loopdown** command.

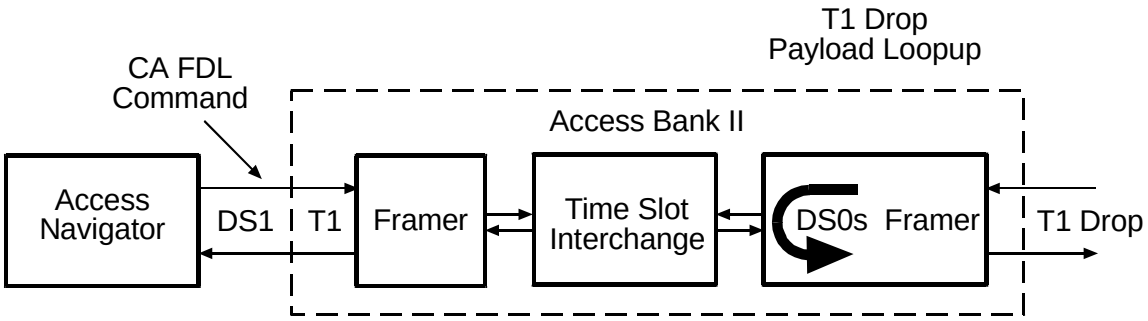

Figure 18-19. Remote T1 Drop Payload Loopup

Security: Level 2 (operator)

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Syntax: **`send remote <n> t1drop payload loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 t1drop payload loopup`**

Message: `Loop command sent to remote.`

Send Remote T1Drop TSI Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify T1 Drop signal processing.

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote t1drop tsi loopup`** command should cause the remote Access Bank II to perform a Time Slot Interface (TSI) loopback on the T1drop side. This takes the received T1drop DS0s, loops them in the TSI, and sends them back to the T1drop output (see Figure 18-20). To loopdown the interface, use the **send remote loopdown** command.

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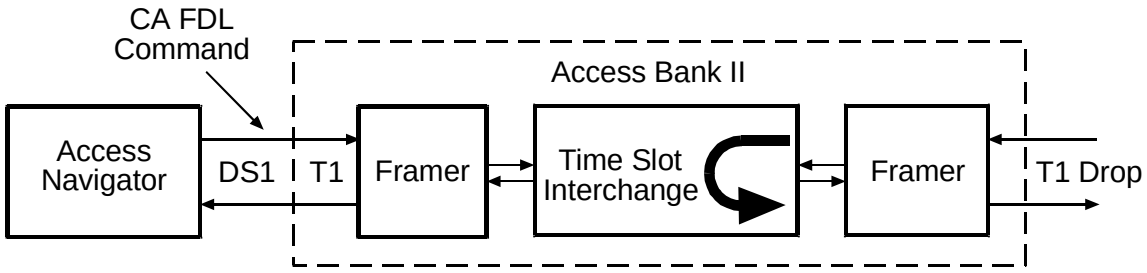

Figure 18-20. Remote T1 Drop TSI Loopup

Security: Level 2 (operator)

Syntax: **`send remote`** <*n*> **`t1drop tsi loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 t1drop tsi loopup`**

Message: `Loop command sent to remote.`

Send Remote V35 Line Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify V.35 signal processing.

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote v35 line loopup`** command should cause the remote Access Bank II to perform a line loopback in the V.35 interface. This takes the received V.35

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signal, loops it in theV.35 interface, and sends it back to the V.35 output (see Figure 18-21). To loopdown the interface, use the **send remote loopdown** command.

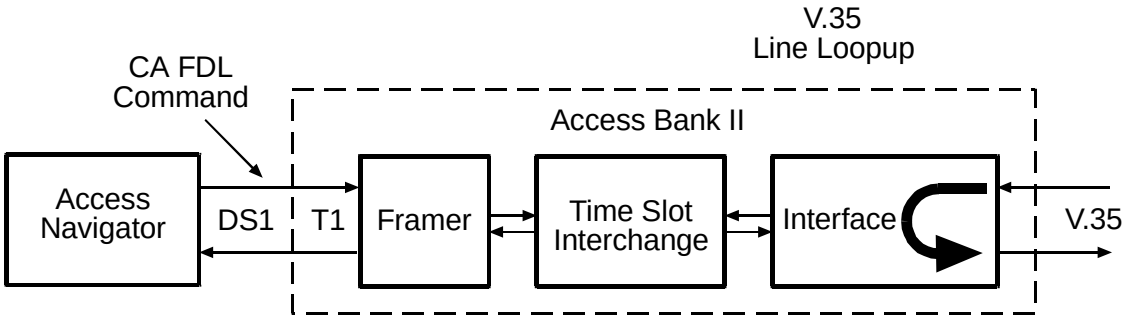

Figure 18-21. Remote V.35 Line Loopup

Security: Level 2 (operator)

Syntax: **`send remote`** *<n>* **`v35 line loopup`**

Field	Description
n	DS1 number, 1 to 32

Example: **`send remote 9 v35 line loopup`**

Message: `Loop command sent to remote.`

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Send Remote V35 TSI Loopup

NOTE: This command applies only to a remote Access Bank II connected to the Access Navigator by a DS1 using Carrier Access FDL management protocol. For normal operation, the loopback must be disabled by the **`send remote loopdown`** command.

NOTE: Only one port of the Access Bank II can be looped up at a time. If a loopup command is received for a second port, the first port will be looped down automatically before the second port is looped up.

NOTE: To check remote loopback status, use the **`read remote loopback`** command. See *Read Remote Loopback* on page 18-51.

Purpose: Sends an *out-of-band* (FDL) message to a remote Access Bank II over the Access Navigator DS1. It is used to verify V.35 signal processing.

When the operator enters a **`send remote`** command, the Access Navigator transmits a message over the Carrier Access FDL management channel of the drop DS1. The Access Navigator's drop DS1 is the Access Bank's T1 connection.

The **`send remote v35 tsi network loopup`** command should cause the remote Access Bank II to perform a network loopback on the V.35 data. This takes the received V.35 DS0s from the DS1, loops them in the Time Slot Interchange (TSI), and sends them back to the DS1 output (see Figure 18-22).

The **`send remote v35 tsi equipment loopup`** command should cause the remote Access Bank II to perform an equipment loopback on the V.35 signal. This takes the received DS0s from the V.35 equipment interface, loops them in the Time Slot Interchange (TSI), and sends them back to the V.35 output (see Figure 18-23). To loopdown the interface, use the **send remote loopdown** command.

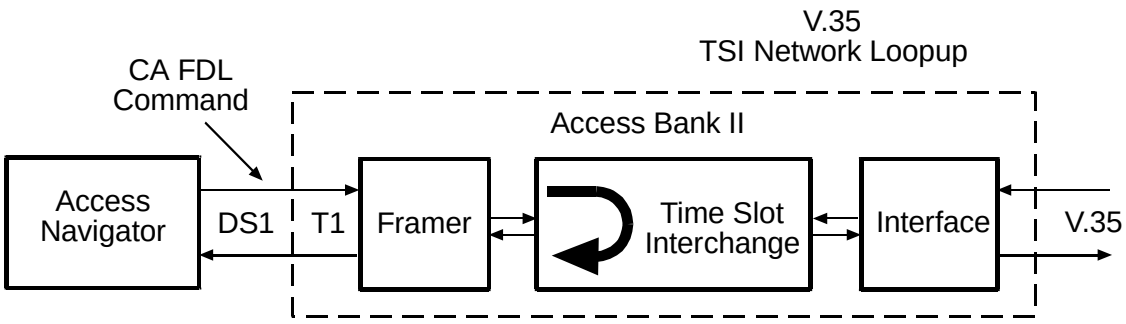

Figure 18-22. Remote V.35 TSI Network Loopup

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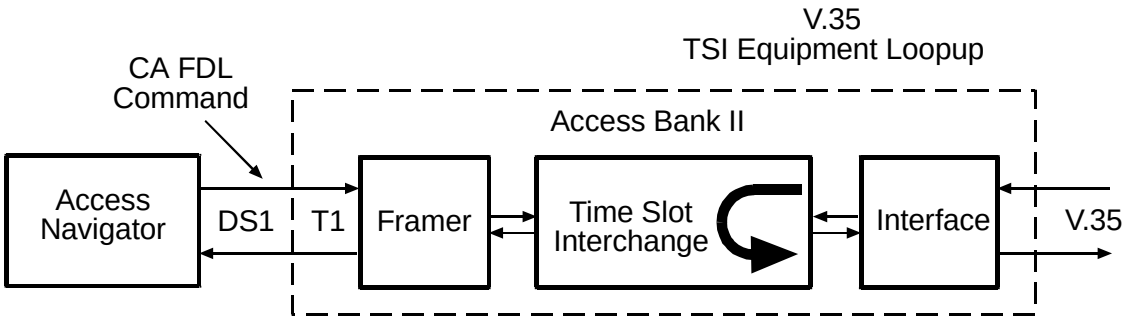

Figure 18-23. Remote V.35 TSI Equipment Loopup

Security: Level 2 (operator)

Syntax: **`send remote <n> v35 tsi <equipment|network> loopup`**

Field	Description
n	DS1 number, 1 to 32.
equipment	Loopup the equipment side
network	Loopup the network side

Example: **`send remote 9 v35 tsi equipment loopup`**

Example: **`send remote 9 v35 tsi network loopup`**

Message: `Loop command sent to remote.`

Send Switch Provision Request

Purpose: This is a Level 1 command that allows a network manager to request ISDN CRV provisioning information for newly configured ISDN CRVs. When RDT provisioning is enabled at the switch, the switch will configure the D channel crossconnections. If RDT provisioning is not enabled, the ISDN CRVs must be entered manually on both the switch and the Access Navigator.

Security: Level 1 (manager)

Syntax: **`send switch provision request`**

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Set Alarms

Purpose: Allows the user to test the Access Navigator alarm functions by manually setting a critical, major, or minor alarm state.

NOTE: Turning alarms on or off will produce alarm messages and log entries stating that the alarm event was manually set or cleared by the user. Manually set alarms are not reported over the GR-303 EOC link to the switch.

Security: Level 2 (operator)

Syntax: **`set alarms <critical|major|minor> <on|off>`**

Field	Description
critical	Select critical alarm
major	Select major alarm
minor	Select minor alarm
on	Activate manual alarm
off	Deactivate manual alarm

Example: **`set alarms major on`**

Lights the major alarm LED on the front panel and closes the contacts on the major alarm relay output.

Set Autoexit

Purpose: This command adds a settable timeout that can be enabled or disabled for each supported CLI session. The Access Navigator can have up to three active CLI sessions at the same time, one via RS-232 and two via Telnet. When enabled, the CLI session will automatically expire if there is no user activity during the specified time period. This feature enhances system security by ensuring that the session will be closed if the user forgets to log off. To disable the feature and prevent a timeout from occurring, enter zero as the time.

Security: Level 2 (operator)

Syntax: **`set autoexit`** *`<minutes>`*

Field	Description
minutes	Timeout period, 1 to 255 minutes. Enter 0 to disable timeout.

Example: **`set autoexit 60`**

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Set Clock

Purpose: Selects the system master transmit clock source. The Access Navigator can obtain its timing from a DS1 line receiver, external Building Integrated Timing Supply (BITS), or its internal Stratum clock oscillator. Clock1 is the primary system clock source. Clock2 is the secondary system clock source, which will be used if the primary clock source (Clock1) fails.

NOTE: DS1s will use the master clock when the DS1 clock source is set to normal using the **set ds1 clock** command.

The user can assign primary and secondary clock sources. If the primary source fails, the Access Navigator will automatically switch over to the secondary clock source. If both clock sources are external sources (DS1 or BITS) and both sources are lost, the Access Navigator will use a "hold over" mode to maintain the last clock frequency.

If the Access Navigator provides GR-303 call support, the primary and secondary clock sources are usually set to "switch" DS1s in the GR-303 interface group.

CAUTION! IF YOU REMOVE A QUAD T1 FRAMER CARD PROVIDING A DS1 CLOCK SOURCE, THE HOLD-OVER MODE WILL NOT MAINTAIN SYSTEM CLOCKING WITHIN SPECIFICATIONS. BEFORE REMOVING THE CARD, YOU SHOULD ALWAYS MOVE THE CLOCK SOURCE TO A DS1 ON A DIFFERENT CARD.

Security: Level 2 (operator)

Syntax: **`set <clock1|clock2> <setting>`**

Field	Description
clock1	Primary system clock source
clock2	Secondary system clock source, which will be used if the primary clock source (Clock1) fails

Setting	Description
bits	Select Building Integrated Timing Source.
ds1 <*n*>	Select DS1 line receiver, n = 1 to 32.
internal	Select internal oscillator.

Example: **`set clock1 ds1 12`**

Example: **`set clock2 bits`**

Example: **`set clock2 internal`**

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Set CRV Idle

Purpose: Clears a permanent off-hook call state (see *Status TMC* on page 18-173) by setting it to the normal idle state. A call can be active, idle, or permanent. You can check the current call state with the **`status crv`** command (see *Status CRV* on page 18-157). An active call can not be set to idle.

NOTE: In the following command, there can be up to 24 CRVs in a range, such as 1-24 or 110-134. The CRVs do not have to be on the same DS1.

Security: Level 2 (operator)

Syntax: **`set crv`** *<value>* **`idle`**

Field	Description
value	Call Reference Value, 1 to 768, or a range of values such as 5-8. Maximum range is 24 CRVs.

Example: **`set crv 10 idle`**

Set Date

Purpose: Set Access Navigator system clock date.

Security: Level 2 (operator)

Syntax: **`set date`** *<mm/dd/yyyy>*

Field	Description
mm/dd/yyyy	Date format is month/day/year with slashes to separate the digits, as in 01/30/1999. The year must be four digits and greater than 1990.

Example: **`set date 1/30/1999`**

Set DS0 CRV

CAUTION! SERVICE DISRUPTIONS CAN OCCUR IF YOU ASSIGN A CRV THAT IS ALREADY IN USE BY ANOTHER SUBSCRIBER. ALWAYS VERIFY CRVS BEFORE MAKING CHANGES.

NOTE: A CRV with an active call can not be moved or reassigned.

NOTE: To avoid duplication when setting CRV numbers, if another channel has the same CRV number, it will be set to CRV #0 (the value for unassigned CRVs).

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Purpose: Assigns a range of DS0s to a range of CRVs. The switch system needs to know the Call Reference Value (CRV) for each DS0 voice termination. The switch uses the CRV to set up GR-303 crossconnects in the Access Navigator. The CRV for each DS0 in the Access Navigator is programmable. Also, using a single CLI command, the operator can assign a range of DS0s to either a sequential range of CRVs for GR-303 service or to an odd-even range of CRVs for TR-08/SLC-96 service. (The Access Navigator provides GR-303 to TR-08 translation for use with Carrier Access' Access Bank I/TR-08.)

Factory default CRVs are sequentially numbered from 1 to 768 (as shown in Figure 18-24), starting with the first DS0 channel on DS1 #1 and continuing to the last DS0 channel on DS1 #32.

If desired, the user can assign different CRV numbers. The only requirement is that the CRVs for all assigned GR-303 or TR-08 voice terminations must be different.

The example in Figure 18-25 assigns DS0 channels 9 to 16 on DS1 #4 to CRVs 111 through 118 in sequential order. The command can also be used to make assignments one at a time.

For TR-08/SLC-96 service, the optional **slc96** modifier makes the command assign a range of DS0s to a range of CRVs in odd-even order. The odd numbered DS0s will be assigned to the first 12 CRVs, and the even numbered DS0s will be assigned to the last 12 CRVs. The example in Figure 18-26 assigns DS0 channels 1 to 24 on DS1 #4 to CRVs 311 through 334.

NOTE: There must be an equal number of DS0 channels and CRVs, up to a maximum of 24 DS0s on one DS1.

NOTE: When using the **slc96** modifier, all 24 DS0s must be assigned at the same time, so the DS0 range must always be 1-24 and the CRV range must always span 24 CRVs.

Security: Level 2 (operator)

Syntax: **`set ds0`** <*n*:*ch*> **`crv`** <*range*> [**`slc96`**]

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
range	Call Reference Value, 1 to 768, or a range of values such as 121-136. Maximum range is 24 CRVs.
slc96	Optional setting. When omitted, DS0s will be assigned to CRVs in sequential order, as shown in Figure 18-25. When included for TR-08/SLC-96 applications, the DS0s will be assigned to CRVs in odd-even order, as shown in Figure 18-26.

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Example: **`set ds0 5:13 crv 122`**

Example: **`set ds0 4:9-16 crv 111-118`**

Example: **`set ds0 4:1-24 crv 311-323 slc96`**

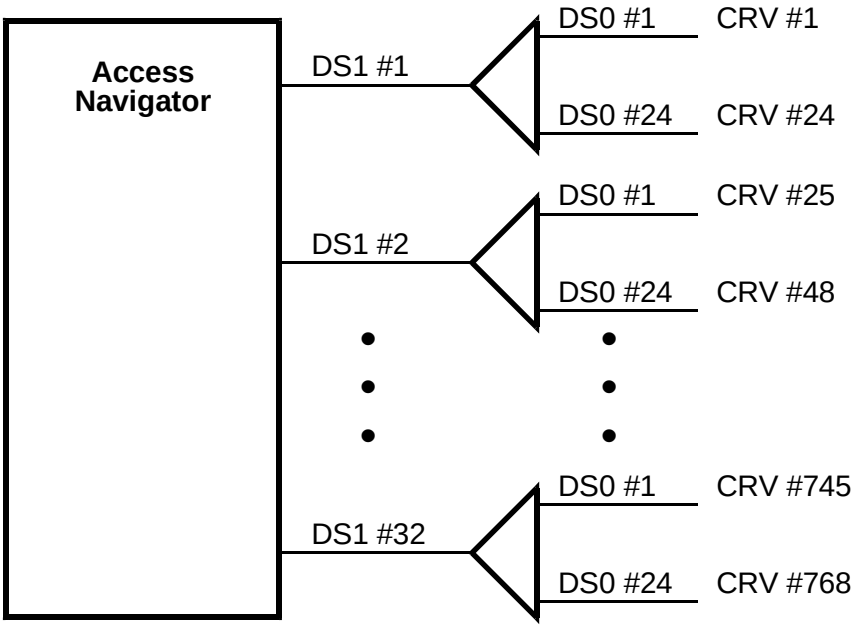

Figure 18-24. Factory Default Call Reference Values

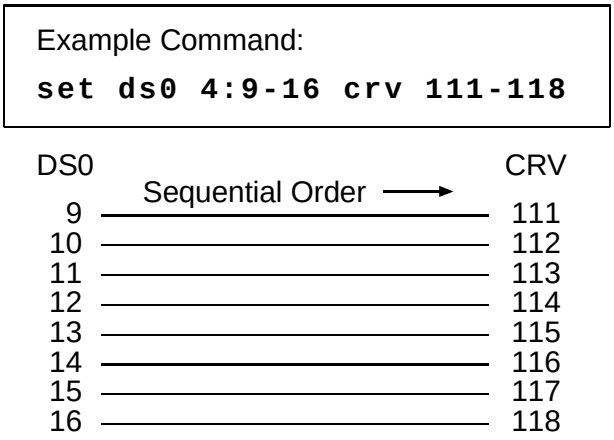

Figure 18-25. DS0s Assigned to CRVs in Sequential Order

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Example Command:

```
set ds0 4:1-24 crv 311-334 slc96
```

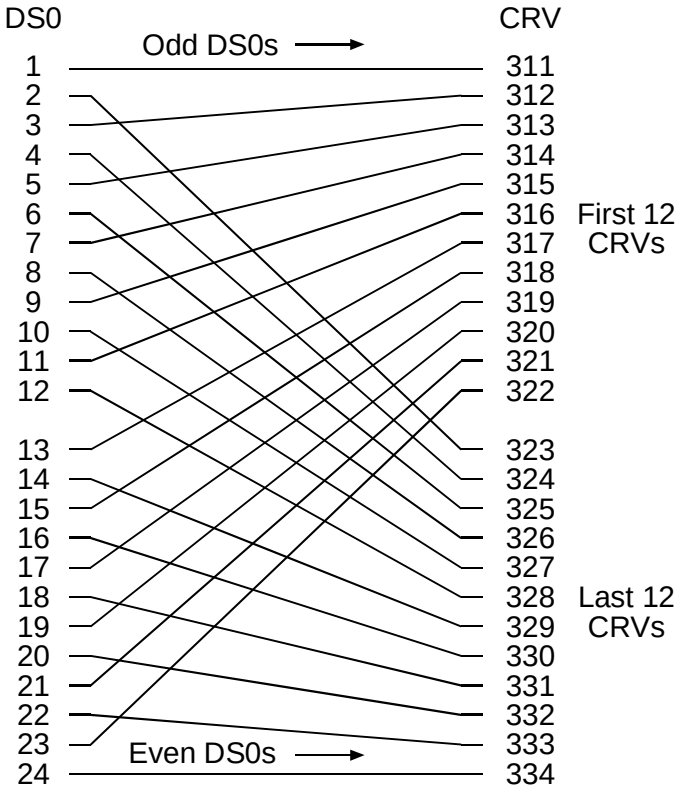

Figure 18-26. DS0s Assigned to CRVs in Odd-Even Order

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Set DS0 ISDN BRI CRV

Purpose: This command does three things. First, it assigns a drop DS0 to an ISDN BRI channel. Second, it defines the DS0 to be a type B1, B2, or D channel. And third, it assigns CRVs for the GR-303 switch and Access Navigator to use in setting up ISDN BRI calls.

This command allows the B1 and B2 channels to be assigned one at a time. Because the 4:1 TDM mode transports the D channel signaling for four BRIs over one DS0, the D channel assignment command requires the operator to enter all four CRVs separated by commas, as shown in the following example. The **`set ds0 isdn none`** command is used to remove an ISDN assignment from a DS0.

NOTE: This command only applies to ISDN BRI channels transported in the GR-303 4:1 TDM mode.

NOTE: The GR-303 switch identifies BRI circuits by their CRVs, which must be provisioned the same in the Access Navigator, Adit 600, and central office switch. Because the 4:1 TDM mode assigns four CRVs to each D channel, it is recommended that BRI circuits be provisioned in groups of four, even if some of the BRIs are not immediately needed.

Security: Level 2 (operator)

Syntax: **`set ds0`** *<n:ch>* **`isdn`** *<b1|b2|d>* **`crv`** *<range>*

Syntax: **`set ds0`** *<n:ch>* **`isdn none`**

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
b1	Bearer channel B1
b2	Bearer channel B2
d	Signaling channel D
range	Call Reference Value, 1 to 768. B1 and B2 channel CRVs are set one at a time. D channel CRVs must be assigned four at a time, either as a range using a hyphen such as 1-4 or as individual numbers separated by commas such as 1,2,8,9. In order to assign fewer than four D channel CRVs, a zero is used as a place holder as in 1,2,0,9.

Example: **`set ds0 10:1 isdn b1 crv 1`**

Example: **`set ds0 10:5 isdn b2 crv 1`**

Example: **`set ds0 10:9 isdn d crv 1-4`**

Example: **`set ds0 10:9 isdn d crv 1,2,3,4`**

Example: **`set ds0 10:10 isdn none`**

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Set DS0 P-Phone

Purpose: Assigns DS0 channels for P-Phone service. The **`set ds0` pphone none** command is used to remove the P-Phone assignment from a DS0.

NOTE: This command only applies to P-Phone (EBS) channels from remote Adit 600 terminals using Carrier Access IP (CAIP) remote management (see *Set DS1 Remote Device Mgmt* on page 18-113.) When connected to a Nortel DMS switch, each Access Navigator can support up to 384 P-Phone channels from up to 14 remote Adit 600 terminals.

Security: Level 2 (operator)

Syntax: **`set ds0`** *<n:ch>* **pphone**

Syntax: **`set ds0`** *<n:ch>* **pphone none**

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
pphone	Set DS0 to carry P-Phone service.
none	Removes P-Phone assignment.

Example: **`set ds0 10:1 pphone`**

Example: **`set ds0 10:2 pphone none`**

Example: **`set ds0 12:9-16 pphone`**

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Set DS0 Service

Purpose: Sets a DS0 channel, or range of channels (up to 24), to the up (In Service) or down (Out of Service) state. DS0s for ISDN BRI circuits can also be set up or down. Alarming is enabled when channels are in service.

To prevent alarms, it is recommended that the CRVs for unused ISDN BRI circuits be set Out of Service at the GR-303 switch, which will cause the switch to ignore D channel signaling for the unused CRVs. Unused B1 and B2 channels can either not be provisioned or be provisioned and then set Out of Service until needed.

NOTE: If a GR-303 switch or drop DS0 is set down, calls will not pass in either direction.

NOTE: Unused ISDN BRI circuits can be set Out of Service by either setting down the B1 and B2 channels or not provisioning them. D channels are treated differently depending on the transport mode. Normally, a 4:1 TDM mode D channel should not be set down because all four CRVs assigned to the D channel would be put out of service. A 3DS0 mode D channel can be treated the same as any other crossconnection between drop and groom DS0s.

Security: Level 2 (operator)

Syntax: **`set ds0 <`***`n:ch`***`> <up|down>`**

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
up	Set DS0 as In Service
down	Set DS0 as Out of Service.

Example: **`set ds0 13:1-16 up`**

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Set DS0 Signal

Purpose: Specifies the signaling on the DS0 channel. The Access Navigator supports Direct Inward Dial (DID), E&M, Ground Start, and Loop Start signaling. Figure 18-27 shows the signaling used in common Access Navigator connections to switch and drop DS0s. The signaling methods shown in this figure are typical and may differ from your requirements.

NOTE: The Access Navigator/GR-303 supports GR-303 Direct Inward Dial (DID) circuit concentration on GR-303 interface groups to switches such as the Lucent 5ESS. (Two-way DOD/DID is not supported.) If the switch does not support GR-303 DID services, the DID circuits can be groomed to a DS1 going to a DID shelf in the Central Office.

NOTE: Direct Inward Dialing (DID) is supported by FXO cards in the Access Bank II and Adit 600.

NOTE: Access Bank II – default setting for FX cards provides automatic translation of GS and LS signaling on the DS0. (The Option A, Option B, and Option C DIP switches on each FX card are set to the OFF position.) E&M and other signaling types can be used, but the DIP switches must be manually set to the correct position. DIP switch settings affect all 12 FX lines on the FX card.

Security: Level 2 (operator)

Syntax: **`set ds0 <`***`n:ch`***`> signal <did|em|gs|gshrg|ls>`**

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
did	Set DS0 to Direct Inward Dial (DID) signaling.
em	Set DS0 to E&M signaling.
gs	Set DS0 to Ground Start signaling.
gshrg	Set DS0 to Ground Start signaling and Hold Ring Ground until the GR-303 switch responds. (This option provides support for Definity® PBXs.)
ls	Set DS0 to Loop Start signaling.

Example: **`set ds0 2:3 signal gs`**

Example: **`set ds0 13:1-16 signal ls`**

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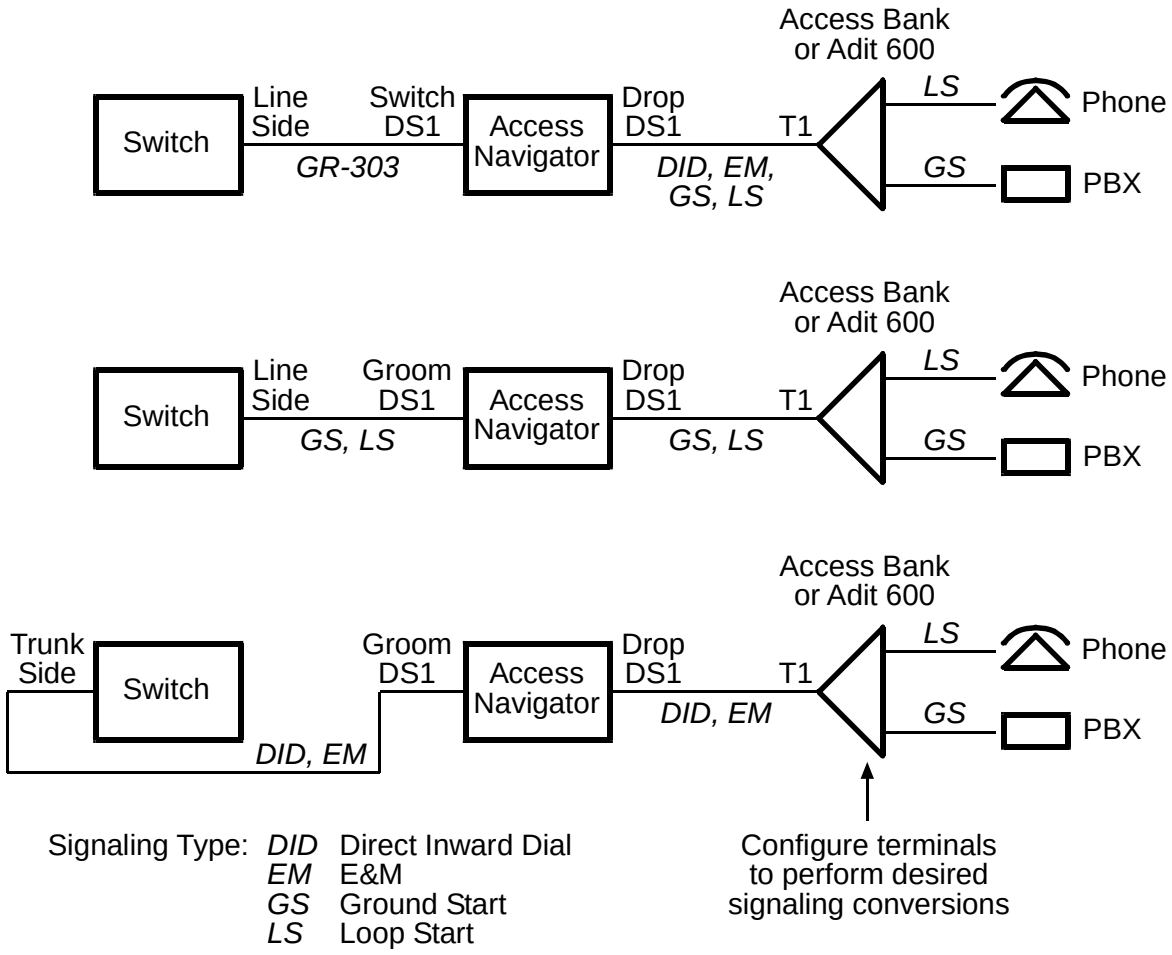

Figure 18-27. Signaling Used in Common Applications

Set DS0 Type

NOTE: If the DS0 is part of a fractional interface used to provision a remote Access Bank II, the DS0 type can not be changed without first deleting the fractional interface.

Purpose: Specifies the DS0 channel type on "Drop" DS1s. There are three types: Voice, Data, and GR-303. The distinction is important because Voice and GR-303 channels use robbed-bit signaling, except when GR-303 carries ISDN BRI traffic, while Data is always a clear channel.

Security: Level 2 (operator)

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Syntax: **set ds0** <*n*:*ch*> **type** <**data|voice|gr303**>

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.
data	Set DS0 to carry DCS data traffic.
voice	Set DS0 to carry DCS voice traffic.
gr303	Enable DS0 to carry GR-303 voice traffic. (ISDN BRI 4:1 TDM mode circuits are automatically assigned as gr303 type.)

Example: **set ds0 2:3 type data**

Example: **set ds0 2:12 type voice**

Example: **set ds0 13:1-16 type gr303**

Set DS1 Clock

Purpose: Sets the transmit clock source for the specified DS1 interface.

Security: Level 2 (operator)

Syntax: **set ds1** <*n*> **clock** <**normal|loop**>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
normal	Set to master transmit clock source.
loop	Set clocking for this DS1 to clock recovered by DS1 receiver. (Should not be used during normal operation.)

Example: **set ds1 9 clock normal**

Example: **set ds1 1-12 clock normal**

Example: **set ds1 9 clock loop**

Set DS1 FDL

Purpose: Selects the FDL protocol used on drop DS1s. Switch and groom DS1s do not use FDL. The Facility Data Link (FDL) channel is a 4 Kbps out-of-band communications link provided by the DS1 Extended Superframe (ESF) format.

NOTE: The factory default setting is “none”. This also turns off out-of-band loopback code detection and transmission over the FDL channel.

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The application affects the permissible DS1 Type, Framing, Line Code, FDL, and Remote Management selections.

Table 18-3 Application Configuration Requirements

Application	Permissible Selections				
	DS1 Type	**DS1 Framing**	**DS1 Line Code**	**DS1 FDL**	**Remote Mgmt**
Voice to GR-303 switch	Switch	ESF	B8ZS	None	None
Voice or data to DCS switch	Groom	D4 or ESF	AMI or B8ZS	None	None
Voice or data to subscriber drop	Drop	D4	AMI or B8ZS	None	None
Voice or data to subscriber drop	Drop	ESF	AMI or B8ZS	None or T1403	None
Adit 600 TDM (FDL mgmt) (controller management DS1)	Drop	ESF	B8ZS	None	CA FDL
Adit 600 TDM (FDL mgmt) (all other DS1s point to controller management DS1)	Drop	ESF	B8ZS	None	DS1 <n>
Adit 600 TDM (IP mgmt) (controller management DS1)	Drop	D4 or ESF	B8ZS	None	CA IP
Adit 600 TDM (IP mgmt) (all other DS1s point to controller management DS1)	Drop	D4 or ESF	B8ZS	None	DS1 <n>
Access Bank II (not remotely provisioned)	Drop	D4 or ESF	AMI or B8ZS	None	None
Access Bank II (remotely provisioned)	Drop	ESF	B8ZS	None	CA FDL
Access Bank I/TR-08 or SLC-96/TR-08 (Shelf A)	Drop	SLC96	AMI or B8ZS	SLC96	None
SLC-96/TR-08 (Shelf B, C, D)	Drop	SLC96	AMI or B8ZS	None	None

NOTE: For remote management description of an Access Bank II or Adit 600 TDM terminal, see *Set DS1 Remote Device Mgmt* on page 18-113.

Security: Level 2 (operator)

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Syntax: **`set ds1 <n> fdl <none|slc96|t1403>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
none	Disable FDL. (This is the required setting for remote management of Adit 600 terminals. See *Set DS1 Remote Device Mgmt* on page 18-113.)
slc96	Enable communications with Shelf A of SLC-96/TR-08 group. (Supports Access Bank I/TR-08 and line loopback commands.)
t1403	Enable detection and response to ANSI T1.403 bit-patterned codes over the FDL.

Example: **`set ds1 12 fdl none`**

Example: **`set ds1 12 fdl t1403`**

Set DS1 Framing

Purpose: Sets the DS1 framing type to D4, ESF, or SLC-96.

Switch DS1s for GR-303 use ESF. Drop DS1s to the Access Bank I/TR-08 use SLC-96 framing. Drop DS1s to a remote Access Bank II use ESF framing, B8ZS line coding, and CA FDL management. For Adit 600 drop DS1s, see *Application Configuration Requirements* on page 18-107.

NOTE: The service application affects the permissible DS1 Type, Framing, Line Code, and FDL selections. For example, ESF is required for remote provisioning, which uses the ESF FDL channel for management communications. ESF is the default setting for the Access Bank II.

Security: Level 2 (operator)

Syntax: **`set ds1 <n> framing <d4|esf|slc96>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
d4	Set DS1 to D4 framing.
esf	Set DS1 to ESF framing.
slc96	Set DS1 to SLC-96/TR-08 framing.

Example: **`set ds1 9 framing esf`**

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Set DS1 ID

Purpose: Sets the carrier's DS1 circuit identifier string.

Security: Level 2 (operator)

Syntax: **`set ds1`** *<n>* **`id`** *<"id">*

Field	Description
n	DS1 number, 1 to 32.
"*id*"	A text string of up to 30 characters enclosed in quote marks.

Example: **`set ds1 9 id "CA ds1 #9"`**

Set DS1 LBO

Purpose: Sets the DS1 line buildout (lbo) to the required DSX-1 equalization or CSU attenuation.

Security: Level 2 (operator)

Syntax: **`set ds1`** *<n>* **`lbo`** *<setting>*

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
setting	The line buildout setting is a number, from 1 to 9. 1 – Set DSX-1 equalization for 0-133 ft. 2 – Set DSX-1 equalization for 133-266 ft. 3 – Set DSX-1 equalization for 266-399 ft. 4 – Set DSX-1 equalization for 399-533 ft. 5 – Set DSX-1 equalization for 533-666 ft. 6 – Set CSU attenuation for LBO of 0dB. 7 – Set CSU attenuation for LBO of -7.5dB. 8 – Set CSU attenuation for LBO of -15dB. 9 – Set CSU attenuation for LBO of -22.5dB.

Example: **`set ds1 9 lbo 8`**

Set DS1 Line Loopup

Purpose: Provides line loopback to verify that the DS1 signal is reaching the Access Navigator's Quad T1 Framer card. The line loopup command creates a connection inside the Line Interface Unit (LIU), causing it to loop the DS1 receive (input) back to the transmit (output). See Figure 18-28.

NOTE: For normal operation, the loopback must be disabled (loopdown).

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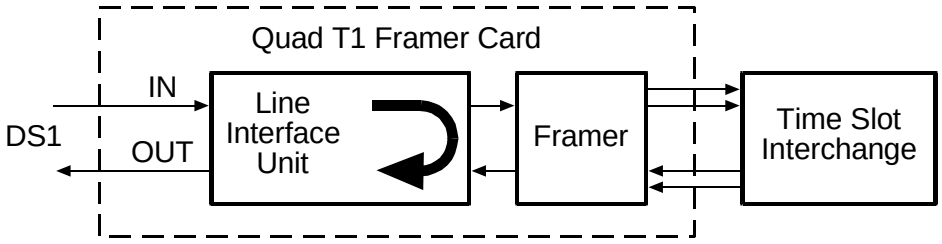

Figure 18-28. DS1 Line Loopback

Security: Level 2 (operator)

Syntax: **`set ds1 <n> line <loopdown|loopup>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable line loopback.
loopdown	Disable line loopback.

Example: **`set ds1 9 line loopdown`**

Set DS1 Linecode

Purpose: Sets the line code for the DS1 to AMI (alternate mark inversion) or B8ZS (binary 8 zero substitution). GR-303 switch DS1s use B8ZS.

Security: Level 2 (operator)

Syntax: **`set ds1 <n> linecode <ami|b8zs>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
ami	Set AMI line coding.
b8zs	Set B8ZS line coding.

Example: **`set ds1 9 linecode b8zs`**

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Set DS1 Loopdetect

Purpose: This is a near-end maintenance command is used to enable CSU line loopback testing of the Access Navigator. When loop request code detection is turned on, the Access Navigator will respond to T1.403 defined in-band CSU bit patterned line loopback requests. See Figure 18-28. On drop DS1s with ESF framing and T1.403 FDL protocol, the Access Navigator will also respond to out-of-band (FDL) loopback requests.

NOTE: Detection is normally turned on for "switch" and "groom" DS1s and turned off for "drop" DS1s. This allows higher level equipment to test the Access Navigator and ignores requests from lower level equipment. This command has no effect on the Access Navigator's ability to test remote CSUs such as Access Banks.

NOTE: In-band loop code detection works with ESF or D4 framing. It will respond to the following T1.403 defined code words, repeated for 5 seconds.
Line loopback activate: 00001 00001 00001 ...
Line loopback deactivate: 001 001 001 001 ...

Security: Level 2 (operator)

Syntax: **`set ds1 <n> loopdetect <on|off>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
on	Enable loop request code detection.
off	Disable loop request code detection.

Example: **`set ds1 9 loopdetect off`**

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Set DS1 Payload Loopup

Purpose: Provides payload loopback to verify DS1 signal processing in the Quad T1 Framer card. The payload loopup command creates a signal connection inside the framer, causing it to loop the received payload data back into the framer, where the 24 DS0s are reframed as the DS1 transmit output. See Figure 18-29.

NOTE: The DS1 must be set Out of Service, using the **`set ds1`** <*n*> **`down`** command, before you can use loopbacks or test patterns.

NOTE: For normal operation, the loopback must be disabled (loopdown).

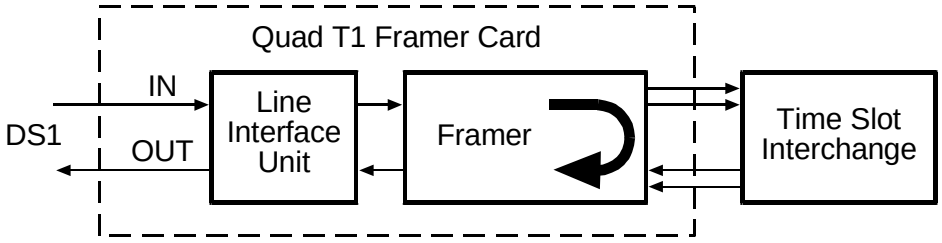

Figure 18-29. DS1 Payload Loopback

Security: Level 2 (operator)

Syntax: **`set ds1`** <*n*> **`payload`** <**`loopup`**|**`loopdown`**>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
loopup	Enable line loopback.
loopdown	Disable line loopback.

Example: **`set ds1 9 payload loopdown`**

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Set DS1 Remote Device Mgmt

Purpose: Sets the remote device management type for the management channel.

NOTE: CA FDL management requires a Type 2 T1 line with ESF framing and FDL capability. If FDL facilities are not available, CA IP management can be used instead to send IP packet data over a DS0 channel in the drop DS1.

NOTE: When remote device management is enabled (any setting except none), the DS1 FDL protocol must be set to none. See *Set DS1 FDL* on page 18-106.

NOTE: The Access Navigator only supports P-Phone service between a remote Adit 600 terminal and a Nortel DMS switch (see *Set Switch Type* on page 18-131). The Access Navigator must be configured for Carrier Access IP management (CAIP) with P-Phone service (pphone) enabled so that the IP DS0 channel can also carry P-Phone management data.

Security: Level 2 (operator)

Syntax: **set ds1** <*n*> **remote device mgmt** <**cafdl**|**caip** *ipaddr*|**ds1** *n*|**none**>

Syntax: **set ds1** <*n*> **remote device mgmt caip** *ipaddr* **pphone**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
cafdl	Set to Carrier Access FDL management channel.
caip *ipaddr*	Set to Carrier Access IP DS0 management channel. *ipaddr* is the IP address of the remote device in the form xxx.xxx.xxx.xxx, where xxx is a number from 0 and 255.
ds1 *n*	Set remote device DS1 to point to the management DS1. There can be only one management DS1 on a remote device, so all other DS1s must be set to point to the management DS1.
none	Turn off Carrier Access remote management.
pphone	Enables P-Phone management channel to a remote Adit 600. **Note**: The Access Navigator must also be conected to a Nortel DMS switch (see *Set Switch Type* on page 18-131).

Example: **set ds1 10 remote device mgmt cafdl**

```
This will affect 'remote device management' for a remote
device using CAIP.
Are you sure you want to change the management type (y/n)?
```

Example: **set ds1 11 remote device mgmt ds1 10**

Example: **set ds1 13 remote device mgmt caip 192.168.3.158**

Example: **set ds1 14 remote device mgmt caip 192.168.3.159 pphone**

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Set DS1 Service

Purpose: Places DS1s in service or out of service. Alarming is turned on when DS1s are set in service (up).

NOTE: If a GR-303 switch or drop DS1 is set down, calls will not pass in either direction.

Security: Level 2 (operator)

Syntax: **`set ds1`** <*n*> <**`up`**|**`down`**>

x	
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
up	Set DS1 as In Service.
down	Set DS1 as Out of Service.

Example: **`set ds1 9 up`**

Set DS1 TermID

Purpose: Sets the GR-303 line termination IDs used by the switch to set up calls through the Access Navigator via the EOC and TMC messages. Customers can change the termination IDs to match different installation configurations. The Access Navigator provides the following default termination IDs for DS1s 25 to 32, so that termination IDs 1 and 2 are on different Quad T1 Framer cards for added protection.

DS1 25 termid = 1
DS1 26 termid = 3
DS1 27 termid = 4
DS1 28 termid = 5
DS1 29 termid = 2
DS1 30 termid = 6
DS1 31 termid = 7
DS1 32 termid = 8

NOTE: To avoid duplication when setting line termination IDs, if another channel has the same termid number, it will be set to termid 0 (not assigned).

Security: Level 2 (operator)

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Syntax: **set ds1** <*n*> **termid** <*id*>

Field	Description
n	DS1 number, 1 to 32.
id	Termination ID, 1 to 28. IDs used by the GR-303 switch must all be different.

Example: **set ds1 5 termid 2**

Set DS1 Threshold

Purpose: Sets the threshold levels for performance monitoring. This command lets the user to set the threshold and measurement interval for each error type. (*Status DS1 Performance* on page 18-162 for descriptions of error types.)

NOTE: To disable threshold checking for a DS1 or error type, set its threshold value to zero.

Security: Level 2 (operator)

Syntax: **set ds1** <*n*> **threshold** <*interval*> <*errortype*> <*value*>

Example: **set ds1 9 threshold day uas 1000**

Example: **set ds1 5-8 threshold hour cv 120**

Field	Description
n	DS1 number, 1 to 32, or range of numbers such as 5-8.
interval	Measurement time period: <**day**|**hour**|**min15**> day – 1 day hour – 1 hour min15 – 15 minutes
errortype	Error type: <**cv**|**es**|**ses**|**sefs**|**dm**|**uas**> cv – Line Code Violations es – Errored Seconds ses – Severely Errored Seconds sefs – Severely Errored Frame Seconds dm – Degraded Minutes uas – Unavailable Seconds
value	Maximum number of errors allowed during measurement interval. Exceeding this value will log a threshold crossing event.

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Set DS1 Type

Purpose: Sets DS1 type. The Access Navigator allows the user to assign any DS1 for drop, groom, or switch operation. If the DS1 type is switch, be sure that the switch type is also defined (see "Set Switch Type" on page 18-131).

NOTE: The default for DCS systems sets all DS1s to drop. The default for GR-303 systems sets DS1s 1-24 to drop and DS1s 25-32 to switch.

NOTE: If the DS1 is part of a fractional interface used to provision a remote Access Bank II, the DS1 type can not be changed without first deleting the fractional interface. (*Provision Remote Access Bank II* on page 11-1)

Security: Level 2 (operator)

Syntax: **`set ds1 <n> type <drop|groom|switch>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
drop	DS1s terminated at a remote terminal.
groom	DS1s terminated at a DCS or Frame Relay.
switch	DS1s terminated at the IDT (GR-303 switch).

Example: **`set ds1 1-18 type drop`**

Example: **`set ds1 25-32 type switch`**

Set EOC

Purpose: Sets the location of the primary and secondary EOCs on "switch" DS1s. GR-303 switch DS1s carry an Embedded Operations Channel (EOC) and Timeslot Management Channel (TMC) for call control. Primary and secondary EOC and TMC lines provide protection.

NOTE: For proper operation, the first switch DS1 (TermID = 1) in the GR-303 interface group must contain the primary EOC and TMC. The second DS1 (TermID = 2) must contain the secondary EOC and TMC. By default, DS1 #25 is TermID 1 and DS1 #29 is TermID 2.

NOTE: It is recommended that primary and secondary EOC and TMC be assigned to different Quad T1 Framer (QF) cards for added protection. In the event one QF card fails, the GR-303 switch will then be able to continue service using the redundant EOC and TMC on a different QF card. QF card #1 contains DS1 #1 to #4 contains DS1 #5 to #8, etc. By default, the primary EOC and TMC are on DS1 #25 and the secondary EOC and TMC are on DS1 #29.

NOTE: A minor alarm will occur if the EOC is set to None.

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Security: Level 2 (operator)

Syntax: **set eoc** <**primary**|**secondary**> <*n:ch*|**none**>

Field	Description
primary	Set location of primary EOC link.
secondary	Set location of secondary EOC link.
n	DS1 number, 1 to 32, that contains EOC link.
ch	DS0 channel, 1 to 24, within DS1.
none	Removes EOC channel assignment

Example: **set eoc primary 25:12**

Example: **set eoc secondary 29:12**

Example: **set eoc primary none**

Set Ethernet IP Address

Purpose: Configures Ethernet settings for Telnet and SNMP. If you are not going to use the Ethernet port, do not make any electrical connections to it. Ethernet functions can only be provisioned through an RS-232 management session, since you must set up the IP address. After establishing a Telnet session, you can change the settings.

NOTE: If you change the IP address via Telnet, you will lose the IP connection. The session will remain in effect for 2 hours while it times out.

Security: Level 2 (operator)

Syntax: **set ethernet ip address** <*address*> <*mask*>

Field	Description
address	Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type **none** for the IP address.

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Field	Description
mask	The Access Navigator uses a subnet mask to identify the permissible range of addresses for each IP address. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Subnet masks have the format *xxx.xxx.xxx.xxx*, where each xxx is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *255.255.0.0* and *255.255.255.0*. If a subnet mask is not used, type **none** or leave blank.

Example: **`set ethernet ip address 192.168.118.65 255.255.255.0`**

Example: **`set ethernet ip address none`**

Set ID

Purpose: Sets the System Identifier of the Access Navigator. This is a name, location, or Telcordia CLLI code. is a text string, such as “Acme Corp. AN#2” or “DNVRCO1A201”. The System Identifier also appears in the command line prompt. The default System Identifier is “Access Navigator” so the command prompt will be “Access Navigator>”. When you change the identifier, the prompt will also change.

NOTE: If other management sessions are in progress, those operators will not see the new prompt until they initiate a new session.

Security: Level 2 (operator)

Syntax: **`set id`** `<"id">`

Field	Description
"*id*"	The user defined identifier can be up to 20 characters long, and may use any combination of letters and numbers. The identifier must be enclosed in quote marks.

Example: **`set id "Acme Corp. AN#2"`**

Example: **`set id "DNVRCO1A201"`**

Set IP Gateway Address

Purpose: Sets IP address to gateway for routing packets that fall outside the Access Navigator’s Ethernet IP address. A gateway is any device that passes packets from one network to another network in their trip across the Internet.

Security: Level 2 (operator)

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Syntax: **`set ip gateway`** *<address>*

Field	Description
address	Gateway addresses have the format *xxx.xxx.xxx.xxx*, where each xxx is a decimal number between 0 and 255. If a gateway address is not used, you must enter **none** for the gateway address.

Example: **`set ip gateway 192.168.0.250`**

Example: **`set ip gateway none`**

Set Remote Config

Purpose: Enables and disables the downloading of configuration data to the remote terminal. The default setting is "on", which enables the Access Navigator to automatically download configuration settings to the remote Access Bank II over the Carrier Access FDL management channel. This setting allows configuration changes to be sent immediately and provides flow-through provisioning when a remote Access Bank II is installed and powered up. When turned off, the Access Navigator will not download any configuration data.

NOTE: To speed up the provisioning of remote services, temporarily turn off remote configuration downloading to the Access Bank II. When finished, turn remote configuration on again, and the Access Navigator will download all changes at once. Downloading to each Access Bank II can take up to one minute. The **`status remote`** command will report "FDL tx in progress" during transmission and "FDL in service as CA FDL" when transmission is complete.

NOTE: Use the **`show remote`** command to display current settings in the Access Navigator data base.

NOTE: The **`set remote config`** command only affects your ability to write configuration settings to the remote Access Bank II data base. You can always use the **`read remote`** command to display the actual remote configuration settings whenever the Access Bank II is connected to the Access Navigator via the DS1 link and Carrier Access FDL management is selected. (See *Provision Remote Access Bank II* on page 11-1.)

Security: Level 2 (operator)

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Syntax: **`set remote config <n> <on|off>`**

Field	Description
n	DS1 number, 1 to 32.
on	Enable automatic provisioning.
off	Disable automatic provisioning.

Example: **`set remote config 9 on`**

Set Remote ID

Purpose: Creates an identifier in the Access Navigator for the remote terminal connected to an Access Navigator drop DS1.

NOTE: Use the **`show remote`** command to display the current setting.

Security: Level 2 (operator)

Syntax: **`set remote <n> id <"name">`**

Field	Description
n	DS1 number, 1 to 32.
name	A user defined name describing the interface. The name is a text string up to 32 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. The name must be enclosed in quote marks.

Example: **`set remote 9 id "AcmeCorp"`**

Set Remote RS232 Baud

Purpose: Sets Access Bank II remote RS-232 interface baud rate.

The Access Bank II provides an RS-232 DTE customer interface port for connection to one DS0 channel. This port supports baud rates from 1,200 to 57,600 between two Access Bank II's and uses a special format to transport asynchronous data over the synchronous DS0 channel.

Security: Level 2 (operator)

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Syntax: **`set remote <n> rs232 baud <setting>`**

Field	Description
n	DS1 number, 1 to 32
setting	Baud rate selections are: 1200, 2400, 4800, 9600, 19200, 38400, 57600

Example: **`set remote 9 rs232 baud 57600`**

Set Remote RS232 Data

Purpose: Sets Access Bank II remote RS-232 interface data bits and parity.

Security: Level 2 (operator)

Syntax: **`set remote <n> rs232 data <e7|o7|n8>`**

Example: **`set remote 9 rs232 data n8`**

Field	Description
n	DS1 number, 1 to 32
e7	7 bit data, even parity
o7	7 bit data, odd parity
n8	8 bit data, no parity

Set Remote RS232 Stop

Purpose: Sets Access Bank II remote RS-232 interface stop bits.

Security: Level 2 (operator)

Syntax: **`set remote <n> rs232 stop <1|2>`**

Field	Description
n	DS1 number, 1 to 32.
1|**2**	Number of stop bits, 1 or 2.

Example: **`set remote 9 rs232 stop 1`**

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Set Remote T1Drop Framing

CAUTION! IF THE T1 DROP ON THE ACCESS BANK II WILL BE USED, THE T1 DROP CIRCUIT OR LOOPBACK MUST BE INSTALLED BEFORE DOWNLOADING THE CONFIGURATION, OTHERWISE THE RESULTING AIS ALARM WILL TAKE DOWN THE FDL COMMUNICATIONS LINK UNTIL THE CIRCUIT IS INSTALLED AND THE ALARM CLEARED

Purpose: Sets the T1 Drop framing type to D4 or ESF. (T1 PBXs generally use D4 framing; T1 routers may use D4 or ESF.)

The Access Bank II provides a second T1 port, called the T1 Drop, for connection to a T1 PBX or T1 router. You can connect one or more DS0s to the T1 Drop, using a fractional interface. The Access Navigator automatically assigns DS0s to the T1 drop in sequential order, starting with T1 Drop DS0 #1. If the router does not have automatic rate sensing, it will have to be programmed for the proper data rate. Use the **`show remote`** command to display the current settings stored in the Access Navigator's data base).

Security: Level 2 (operator)

Syntax: **`set remote`** <*n*> **`t1drop framing <d4|esf>`**

Field	Description
n	DS1 number, 1 to 32.
d4	Set T1 Drop to D4 framing.
esf	Set T1 Drop to ESF framing.

Example: **`set remote 9 t1drop framing d4`**

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Set Remote T1Drop LBO

Purpose: This command sets the T1 Drop line buildout (lbo) to the required DSX-1 equalization or CSU attenuation.

Security: Level 2 (operator)

Syntax: **`set remote`** *<n>* **`t1drop lbo`** *<setting>*

Field	Description
n	DS1 number, 1 to 32.
setting	The line buildout setting is a number, from 1 to 9. 1 – Set DSX-1 equalization for 0-133 ft. 2 – Set DSX-1 equalization for 133-266 ft. 3 – Set DSX-1 equalization for 266-399 ft. 4 – Set DSX-1 equalization for 399-533 ft. 5 – Set DSX-1 equalization for 533-666 ft. 6 – Set CSU attenuation for LBO of 0dB. 7 – Set CSU attenuation for LBO of -7.5dB. 8 – Set CSU attenuation for LBO of -15dB. 9 – Set CSU attenuation for LBO of -22.5dB.

Example: **`set remote 9 t1drop lbo 3`**

Set Remote T1Drop Linecode

Purpose: Sets the T1 Drop line coding to AMI (alternate mark inversion) or B8ZS (binary 8 zero substitution).

Security: Level 2 (operator)

Syntax: **`set remote`** *<n>* **`t1drop linecode`** *<ami|b8zs>*

Field	Description
n	DS1 number, 1 to 32.
ami	Set AMI line coding.
b8zs	Set B8ZS line coding.

Example: **`set remote 9 t1drop linecode b8zs`**

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Set Remote T1Drop PRM

Purpose: Sets the T1 Drop performance message type to either ANSI T1.403 one-second Performance Report Messages (PRMs) or AT&T 54016 Maintenance Messages over the 4 Kbps ESF Facility Data Link (FDL).

Security: Level 2 (operator)

Syntax: **`set remote <n> t1drop prm <ansi|att>`**

Field	Description
n	DS1 number, 1 to 32.
ansi	Set to ANSI T1.403 performance report messages.
att	Set to AT&T 54016 maintenance messages.

Example: **`set remote 9 t1drop prm att`**

Set Remote V35 ClockInv

Purpose: Sets the Access Bank II V.35 interface transmit and receive clock polarity. The clock signals for each direction can be normal or inverted.

The Access Bank II provides a V.35 port for connection to a V.35 router. You can connect one or more DS0s to the V.35 port, using a fractional interface. If the router does not have automatic rate sensing, it will have to be programmed for the proper data rate. Use the **`show remote`** command to display the current settings stored in the Access Navigator's data base.

Security: Level 2 (operator)

Syntax: **`set remote <n> v35 clkinv <rx|tx|rxtx|none>`**

Field	Description
n	DS1 number, 1 to 32.
rx	Invert receive clock only.
tx	Invert transmit clock only.
rxtx	Invert both receive and transmit clock.
none	No clock inversion.

Example: **`set remote 9 v35 clkinv none`**

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Set Remote V35 CTS

Purpose: Sets the Access Bank II V.35 interface Clear to Send (CTS) timing and signal levels for flow control. The CTS logic signal can be always high or low, or set to follow the Carrier Detect (CD) or Ready to Send (RTS) signals.

Security: Level 2 (operator)

Syntax: **`set remote <`***`n`***`> v35 cts <cd|high|low|rts>`**

Field	Description
n	DS1 number, 1 to 32.
cd	CTS follows CD.
high	CTS always high.
low	CTS always low.
rts	CTS follows RTS.

Example: **`set remote 9 v35 cts rts`**

Set Remote V35 Data

Purpose: Sets the Access Bank II V.35 interface data polarity to normal or inverted.

Security: Level 2 (operator)

Syntax: **`set remote <`***`n`***`> v35 data <invert|normal>`**

Field	Description
n	DS1 number, 1 to 32.
invert	Invert data.
normal	No data inversion.

Example: **`set remote 9 v35 data normal`**

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Set Remote V35 DSU

Purpose: Determines if the Access Bank II V.35 interface will respond to standard V.54 Data Service Unit (DSU) loopcode patterns for payload loopbacks. When enabled (default setting), the interface will respond to loopup and loopdown codes. This permits remote testing of the V.35 data link up to the customer interface.

Security: Level 2 (operator)

Syntax: **`set remote <n> v35 dsu <off|on>`**

Example: **`set remote 9 v35 dsu on`**

Field	Description
n	DS1 number, 1 to 32.
off	Disables DSU loopcode detection.
on	Enables DSU loopcode detection.

Set Remote V35 RxClock

Purpose: Sets the Access Bank II V.35 interface receive clock source to internal or external.

NOTE: Internal clock source timing is recommended. This setting prevents data slips by synchronizing the receive timing to the T1 interface.

Security: Level 2 (operator)

Syntax: **`set remote <n> v35 rxclk <int|ext>`**

Field	Description
n	DS1 number, 1 to 32.
int	Set to internal clock source.
ext	Set to external clock source

Example: **`set remote 9 v35 rxclk int`**

Set Remote V35 Speed

Purpose: Sets the DS0 data speed to either N×56 Kbps (7-bit words) or N×64 Kbps (8-bit words), where N is the number of DS0s assigned to the V.35 interface. The V.35 port is a synchronous interface, so both the speed and number of DS0s are required to calculate the clock rate. For example, if four DS0s are assigned, the N×56 setting produces a rate of 224 Kbps. When N×56 is selected, the V.35 interface inserts a zero into the least significant bit of the DS0 octet.

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Security: Level 2 (operator)

Syntax: **`set remote <n> v35 speed <56|64>`**

Field	Description
n	DS1 number, 1 to 32.
56	Selects N times 56 Kbps speed, where N is number of DS0s assigned.
64	Selects N times 64 Kbps speed, where N is number of DS0s assigned.

Example: **`set remote 9 v35 speed nx64`**

Set Screen

Purpose: Sets the number of lines in the terminal display screen before the message pauses. If you enter the number of lines in the display screen, the CLI messages will automatically pause at the bottom of the screen to prevent data from scrolling off the screen. The CLI will print --More-- at the bottom of the screen to indicate that there is more data to be displayed.

Use the following keys to display more of the message.

- Press Space key to advance message by one full screen.
- Press Tab key to advance message by two lines.
- Press Enter or Return key to advance message by one line.
- Press Escape key to cancel remainder of message.

NOTE: The factory default setting is 24 text lines. If messages scroll off the screen, either adjust the window size on your computer or use the **`set screen`** command to set the number of text lines returned by the CLI.

Security: Level 3 (monitor)

Syntax: **`set screen <height|off>`**

Field	Description
height	Height (in text lines) of terminal screen display. Defualt is 24.
off	Disables screen pause feature

Example: **`set screen 32`**

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Set SNMP Contact

Purpose: Assigns a system contact name (sysContact) to the Access Navigator SNMP interface. This is the person or office to be contacted when there are service questions. In most cases, this is the site manager.

Syntax: **`set snmp contact`** *<"setting">*

Field	Description
"*setting*"	The contact name is a text string up to 255 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp contact "site manager"`**

Set SNMP GetCom

Purpose: Assigns a Get-Community string (getCommunity) to the Access Navigator SNMP interface. This is the user name for system access using SNMP "get" commands to retrieve settings. This name will be verified before changing data. For unrestricted access, it is traditional to set this string to "public" on both the Access Navigator and network manager.

To protect management access, the Community names can only be viewed and changed by CLI commands.

Security: Level 2 (operator)

Syntax: **`set snmp getcom`** *<"setting">*

Field	Description
"*setting*"	The get-community name is a text string up to 32 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp getcom "public"`**

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Set SNMP Location

Purpose: Assigns a system location (sysLocation) to the Access Navigator SNMP interface. This is a text description or code indicating the location of the network element. Codes such as the 11-character Telcordia (Bellcore) Common Language Location Identifier (CLLI) are often used to specify equipment locations. For example, the code DNVRCO1A201 could represent equipment located in Denver, Colorado, in equipment rack location 1A201.

Security: Level 2 (operator)

Syntax: **`set snmp location`** *<"setting">*

Field	Description
"*setting*"	The location is a text can be up to 255 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp location "DNVRCO1A201"`**

Set SNMP Name

Purpose: Assigns an system name (sysName) to the Access Navigator SNMP interface for network management. This name or identification code is used to describe the network element.

Simple Network Management Protocol (SNMP) enables network operations centers (NOCs) to monitor and manage network elements across an internetwork. The Access Navigator supports SNMP through its Ethernet port. The following CLI commands are used to set up the Access Navigator for access by the carrier's TCP/IP management network.

Security: Level 2 (operator)

Syntax: **`set snmp name`** *<"setting">*

Field	Description
"*setting*"	The name is a text string up to 255 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp name "Acme Corp AN#2"`**

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Set SNMP NMS Address

Purpose: Assigns an IP address for use by the Access Navigator SNMP agent for sending trap alarm messages to three different Network Management System (NMS) IP addresses.

To protect management access, the Community names can only be viewed and changed by CLI commands.

Security: Level 2 (operator)

Syntax: **`set snmp nms <1|2|3> <address>`**

Field	Description
1|**2**|**3**	A number (1, 2, or 3) used to identify the NMS station.
address	The Internet Protocol (IP) address of the NMS station. IP addresses have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers.

Example: **`set snmp nms 1 192.168.0.50`**

Set SNMP SetCom

Purpose: Assigns a Set-Community string (setCommunity) to the Access Navigator SNMP interface. This is the user name for system access using SNMP "set" commands to change settings. This name will be verified before changing data. For unrestricted access, it is traditional to set this string to "public" on both the Access Navigator and network manager.

To protect management access, the Community names can only be viewed and changed by CLI commands.

Security: Level 2 (operator)

Syntax: **`set snmp setcom <"setting">`**

Field	Description
"*setting*"	The set-community name is a text string up to 32 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp setcom "public"`**

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Set SNMP TrapCom

Assigns a Trap-Community string (trapCommunity) to the Access Navigator SNMP interface. This is the user name reported with each trap message for authentication.

Security: Level 2 (operator)

Syntax: **`set snmp trapcom <"setting">`**

Field	Description
"*setting*"	The trap-community name is a text string up to 32 characters long, and may use any combination of letters and numbers. Settings must be enclosed in quote marks.

Example: **`set snmp trapcom "public"`**

Set Switch Type

Purpose: This command identifies the switch type used for GR-303 operation and specifies the managed object classes that the Access Navigator must support. This command applies to all Access Navigator items managed over the GR-303 EOC. To see the current setting, see *Show Switch* on page 18-154.

Security: Level 2 (operator)

Syntax: **`set switch type <5ess|dms|generic>`**

Field	Description
5ess	Set switch type to Lucent 5ESS.
dms	Set switch type to Nortel DMS.
generic	Set switch to generic type (Telcordia generic TR-303 specification, Supplement 3 EOC definition)

Example: **`set switch type 5ess`**

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Set Time

Purpose: Set Access Navigator system clock time.

Security: Level 2 (operator)

Syntax: **`set time`** *<hh:mm:ss>*

Field	Description
hh:mm:ss	Time format is 24-hour clock in hours:minutes:seconds with colons to separate the digits, as in 08:30:45 and 15:22:10. Leading zeros can be omitted. The Access Navigator will update the time when it receives the command.

Example: **`set time 08:30:00`**

Example: **`set time 8:9:15`**

Set TMC

Purpose: This command sets the location of the primary and secondary TMCs on "switch" DS1s. GR-303 switch DS1s carry an Embedded Operations Channel (EOC) and Timeslot Management Channel (TMC) for call control. Primary and secondary EOC and TMC lines provide protection.

NOTE: For proper operation, the first switch DS1 (TermID = 1) in the GR-303 interface group must contain the primary EOC and TMC. The second DS1 (TermID = 2) must contain the secondary EOC and TMC. By default, DS1 #25 is TermID 1 and DS1 #29 is TermID 2.

NOTE: It is recommended that primary and secondary EOC and TMC be assigned to different Quad T1 Framer (QF) cards for added protection. In the event one QF card fails, the GR-303 switch will then be able to continue service using the redundant EOC and TMC on a different QF card. QF card #1 contains DS1 #1 to #4, QF card #2 contains DS1 #5 to #8, etc. By default, the primary EOC and TMC are on DS1 #25 and the secondary EOC and TMC are on DS1 #29.

NOTE: A minor alarm will occur if the TMC is set to None.

Security: Level 2 (operator)

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Syntax: **`set tmc <primary|secondary> <n:ch|none>`**

Field	Description
primary	Set location of primary TMC link.
secondary	Set location of secondary TMC link.
n	DS1 number, 1 to 32, that contains TMC link.
ch	DS0 channel, 1 to 24, within the DS1.
none	Removes TMC channel assignment.

Example: **`set tmc primary 25:24`**

Example: **`set tmc secondary 29:24`**

Example: **`set tmc primary none`**

Set User Level

Purpose: This is a Level 1 command that allows a network manager to set security access levels for each user name. All users have Level 1 access (highest) unless changed to a lower access level.

NOTE: There must be at least one Level 1 user.

Security: Level 1 (manager)

Syntax: **`set user <"name"> level <access>`**

Field	Description
name	User names can be up to 10 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. Names are not case sensitive. Upper case (capital letters) will be converted to lower case letters before being processed. The name must be enclosed in quotes if it contains spaces.. You can display a list of all user names with the command *Show Users* on page 18-155.
access	User access level: 1, 2, or 3. 1 – Manager, with access to all commands. Can add and delete users. There must be at least one Level 1 user. 2 – Operator, with access to all commands except adding and deleting users, restoring defaults, uploading and downloading configurations, and sending switch provisioning requests. Can change own password. 3 – Monitor, with access limited to displaying reports and status. No access to any commands that could affect system operation.

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Example: **`set user "alice" level 2`**

Set User Password

Purpose: A Level 1 user (network manager) can set the password associated with any user name for logging on to the Access Navigator. The network manager normally assigns a password after adding a user name. However, this only ensures that the user must use it to log into the system the first time. After logging in, any user can change, add, or delete their own password.

Password protection is optional. If no password is defined for a user, CLI will not require a password to log into the Access Navigator.

Security: Level 1 (manager) can change any user's password.
Level 2 (operator) and Level 2 (monitor) can change only their own password.

Syntax: **`set user <"name"> password`**

Field	Description
name	User names can be up to 10 characters long, and may use any combination of letters and numbers. No spaces or special characters are allowed. Names are not case sensitive. Upper case (capital letters) will be converted to lower case letters before being processed. The name must be enclosed in quotes if it contains spaces.. You can display a list of all user names with the command *Show Users* on page 18-155.

Example: **`set user "alice" password`**

```
New Password:******
New Password again:******
```

The system will prompt you to enter a new password twice for verification. To ensure security, password characters are displayed as asterisks.

Passwords can be up to 10 characters long and may use any combination of letters and numbers. Spaces and special characters are not allowed. Passwords are case sensitive, so that upper and lower case letters are different.

NOTE: To delete a user password, so that the user has access without a password, just press the Enter or Return key each time the system prompts you to enter the password.

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Show Autoexit

Purpose: Displays the current setting for the autoexit timeout.

Security: Level 3 (monitor)

Syntax: **`show autoexit`**

Message:

```
CLI session timeout = 15 minutes.
```

Show Clock

Purpose: Displays the current settings for the primary and secondary master transmit clock source.

Security: Level 3 (monitor)

Syntax: **`show clock`**

Message:

```
Primary Master Transmit Clock Source:   DS1 12
Secondary Master Transmit Clock Source: INTERNAL
```

Description:

Item	Description
Clock Source	Clock source can be a DS1 line receiver, internal Stratum clock oscillator, or external Building Integrated Timing Supply (BITS).

Show Connect

Purpose: Displays static DS0 connections in the specified DS1. This display will list the current static DS0 crossconnect settings and dynamic GR-303 voice and ISDN BRI connections. If a DS0 is part of a fractional interface, the interface name will be shown.

For GR-303 service, the switch assigns GR-303 voice connections as needed, between switch DS1s and drop DS1s. ISDN BRI using 4:1 TDM mode transport has the D signaling channel statically connected to a switch DS0, while the switch only sets up B1 and B2 bearer DS0s as needed between switch DS1s and drop DS1s.

NOTE: ISDN BRI connections using the GR-303 4:1 TDM transport mode will appear as type GR-303.

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Security: Level 3 (monitor)

Syntax: **show connect** <*n*>

Field	Description
n	DS1 number, 1 to 32.

Example: **show connect 10**

Example: **show connect 25**

Message:

```
Connections for DS1 #10 (CA DS1# 10):

From  To    Type  Interface [--> Port]
----  ----- ----- --------------------
10:01 ..... GR303
10:02 ..... GR303
10:03 ..... GR303
10:04 ..... GR303
10:05 ..... GR303
10:06 ..... GR303
10:07 ..... GR303
10:08 ..... GR303
10:09 25:17 GR303
10:10 ..... GR303
10:11 ..... GR303
10:12 ..... GR303
10:13 .....
10:14 .....
10:15 .....
10:16 .....
10:17 09:12 DATA  AcmeInternet --> V.35
10:18 09:13 DATA  AcmeInternet --> V.35
10:19 09:14 DATA  AcmeInternet --> V.35
10:20 09:15 DATA  AcmeInternet --> V.35
10:21 09:16 DATA  AcmeInternet --> V.35
10:22 09:17 DATA  AcmeInternet --> V.35
10:23 09:18 DATA  AcmeInternet --> V.35
10:24 09:19 DATA  AcmeInternet --> V.35
```

Description:

Item	Description
From	DS0 on specified DS1. Format is DS1:DS0, where DS1 is a number from 1 to 32 and DS0 is a number from 1 to 24.
To	Shows static connection, if any, from DS0 in first column to DS0 in second column.

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Item	Description
`.....`	Indicates no current connection to another DS0 in the Access Navigator. (GR-303 connections are dynamic and will be displayed when calls are connected.)
Type	VOICE – voice channel DATA – data channel GR303 – GR-303 voice channel or ISDN BRI 4:1 TDM EOC-P – EOC primary channel EOC-S – EOC secondary channel TMC-P – TMC primary channel TMC-S – TMC secondary channel
Interface	Name of fractional interface, if any, using "From" DS0.
`[--> Port]`	Remote interface port, if any, connected to fractional interface.

Show CRV

Purpose: Displays the range of CRVs requested (up to 24), along with the DS1 and DS0 channel to which they are currently assigned.

Factory default CRVs are sequentially numbered from 1 to 768, starting with the first DS0 channel on DS1 #1 and continuing to the last DS0 channel on DS1 #32. See Figure 18-30 on page 18-138.

If desired, the user can assign different CRV numbers. (See *Set DS0 CRV* on page 18-97.) The only requirement is that the CRVs for all assigned GR-303 or TR-08 voice terminations must be different.

NOTE: In the following command, there can be up to 24 CRVs in a range, such as 1-24 or 110-134. The CRVs do not have to be on the same DS1.

Security: Level 3 (monitor)

Syntax: **`show crv`** `<range>`

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **`show crv 6`**

Example: **`show crv 1-8`**

Message:

```
CRV   Interface            Status
---   ---------            ------
1     DS1 #1 channel 1     In Service
2     DS1 #1 channel 2     In Service
```


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```
3     DS1 #1 channel 3     In Service
4     DS1 #1 channel 4     In Service
5     DS1 #12 channel 25   Assigned to ISDN
6     DS1 #12 channel 26   Assigned to ISDN
7     DS1 #12 channel 27   Assigned to ISDN
8     DS1 #12 channel 28   Out of Service
```

Description:

Item	Description
CRV	Call Reference Value, 1 to 768.
Interface	Numbers – indicate DS1:DS0 channel assignments Not Assigned – CRV is not assigned to a DS0 Assigned to ISDN – Use **`show isdn crv`** command for additional information
Status	In Service Out of Service Not Available – Channel not configured for GR-303

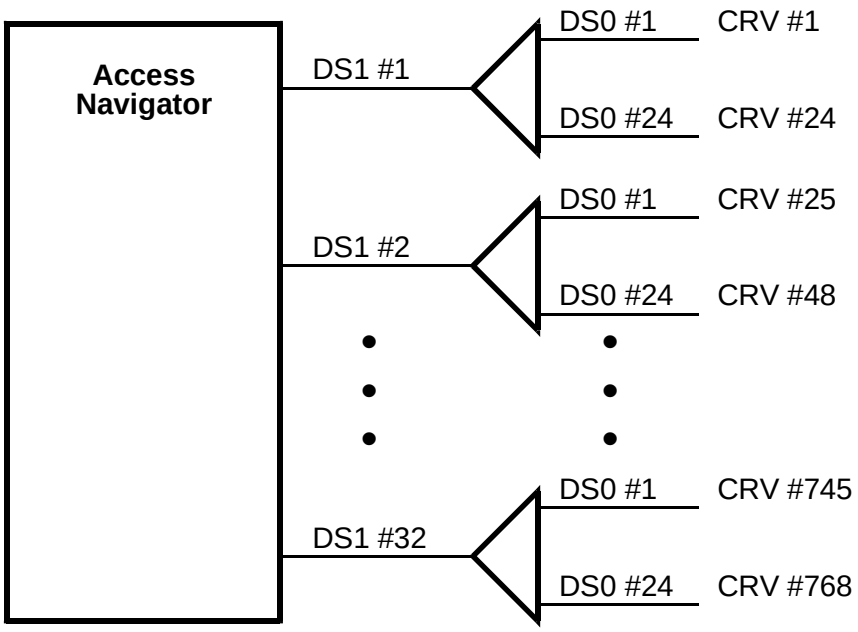

Figure 18-30. Factory Default Call Reference Values

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Show Date

Purpose: Display Access Navigator system clock date. Date format is month/day/year.

Security: Level 3 (monitor)

Syntax: **show date**

Message: 1/30/1999

Show DS0

Purpose: Displays the settings for each DS0 specified.

Security: Level 3 (monitor)

Syntax: **show ds0** *<n:ch>*

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.

Example: **show ds0 10:1-4**

Message:

```
Settings for DS1 13, Channel 1:
     Type:               GR303
     Signaling:          LOOP START
     Up/Down:            UP
     CRV:                35
     PPHONE:             Enabled
     ISDN:               None

Settings for DS1 13, Channel 2:
     Type:               GR303
     Signaling:          DID
     Up/Down:            UP
     PPHONE:             Enabled
     CRV:                36
     ISDN:               None

Settings for DS1 13, Channel 3:
     Type:               DATA
     Up/Down:            DOWN
     CRV:                No CRV assigned
     PPHONE:             Enabled
     ISDN:               None
```


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```
Settings for DS1 13, Channel 4:
     Type:              GR303
     Up/Down:           UP
     CRV:               38
     PPHONE:            Enabled
     ISDN:              None
```

NOTE: In the above message, the channel type can be GR303 (voice or ISDN BRI), or private crossconnects using VOICE or DATA. P-Phone settings only appear in the Access Navigator / GR-303 Host with P-Phone.

Description:

Item	Description
Type	VOICE, DATA, GR303 (voice). (Both ISDN and P-Phone service require GR303 type.)
Signaling	LOOP START, GROUND START, E&M, Direct Inward Dial. (No signaling is used for data types or ISDN BRI. E&M is not valid for GR-303.)
Up/Down	UP (in service), DOWN (out of service).
CRV	Call Reference Value, 1 to 768, or "No CRV assigned"
ISDN	ISDN BRI channel (if any), B1, B2, or D
PPHONE	ENABLED, DISABLED.

Show DS1

Purpose: Displays the DS1 settings and current service status, including thresholds for detected near-end line errors. This command will show the current settings in a message similar to the following. The settings can be changed with the various **`set ds1`** commands. (To quickly display an abbreviated list of all 32 DS1s, use the **`show ds1 all`** command.)

Security: Level 3 (monitor)

Syntax: **`show ds1`** <*n*>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`show ds1 12`**

Example: **`show ds1 1-8`**

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Message:

```
Settings for DS1 9:
  Circuit ID:              CA DS1# 9
  Up/Down:                 DOWN
  Framing:                 ESF
  Line Coding:             B8ZS
  Type:                    DROP
  Clock Source:            NORMAL
  Line Build Out:          CSU ATTEN FOR -15dB
  Loop Code Detection:     ON
  Loop Back:               OFF
  Line Termination ID:     0 (for switch DS1s only)
  Remote Device MGMT:      CA IP 192.168.201.1
  PPHONE Call Connection:  Enabled
  FDL Type:                None
  Send Code:               NONE
  Performance Thresholds:      15 min.    1 hour     1 day
                              --------   -------    ------
  unavailable seconds:               0         0         0
  severely errored seconds:          0         0         0
  errored seconds:                   0         0         0
  sev. errored frame seconds:        0         0         0
  degraded minutes:                  0         0         0
  linecode violations:               0         0         0
```

NOTE: The Performance Thresholds are threshold values, not error counts.

Description:

Item	Description
Circuit ID	Circuit identifier set by user for the DS1 number.
Up/Down	Link service status: UP, DOWN.
Framing	D4 (SF), ESF, SLC96 (S4).
Line Coding	AMI, B8ZS.
Type	DROP, GROOM, SWITCH. Switch type appears only with GR-303 option.
Clock Source	NORMAL, LOOP.
Line Build Out	DSX-1 equalization (ft.), CSU attenuation (dB).
Loop Code Detection	ON, OFF.
Loop Back	OFF, LINE, PAYLOAD.
Line Termination ID	Line termination identifier, 1 to 28, set by user (used by GR-303 only.
Remote Device MGMT	NONE, CAFDL, CAIP <ipaddress>, DS1 <n>.

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Item	Description
PPHONE Call Connection	ENABLED, DISABLED. This setting is enabled by the *Set DS1 Remote Device Mgmt* on page 18-113.
FDL Type	NONE, SLC96 (DDL), T1403 (ANSI T1.403). Switch DS1 FDL type is always None.
Send Code	P2E11, P2E15, P2E23, QRSS. (Does not appear unless a code is being sent.
Performance Thresholds	See table below

Performance Thresholds	Description
unavailable seconds	(UAS) The number of seconds that the interface is unavailable. The DS1 interface is said to be unavailable from the onset of 10 contiguous SESs, or the onset of the condition leading to a failure. If the condition leading to the failure was immediately preceded by one or more contiguous SESs, then the DS1 interface unavailability starts from the onset of these SESs. While the interface is deemed unavailable, the only count that is incremented is UASs.
severely errored seconds	(SES) For ESF links, the number of one-second intervals containing 320 or more Path Code Violation Error Events OR one or more Out of Frame defects OR a detected AIS defect. For D4 signals, the number of one-second intervals with Framing Error events, or an OOF defect, or 1544 LCVs or more. Controlled slips are not included in this parameter. SES is not incremented during an Unavailable Second.
errored seconds	(ES) For ESF links, the number of one-second intervals containing one or more Path Code Violations OR one or more Severely Errored Frame defects OR one or more Controlled Slip events OR a detected AIS defect. For D4 links, the presence of Bipolar Violations also triggers an Errored Second. ES is not incremented during an Unavailable Second.
sev. errored frame seconds	(SEFS) The number of one-second intervals containing one or more Out of Frame defects OR a detected AIS defect.

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Performance Thresholds	Description
degraded minutes	(DM) The total number of minutes in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3. Degraded Minutes are determined by collecting all of the Available Seconds, removing any Severely Errored Seconds, grouping the result in 60-second long groups, and counting a 60-second long group (one minute) as degraded if the cumulative errors during the seconds present in the group exceed 1E-6. Available seconds are merely those seconds that are not Unavailable (UAS).
linecode violations	(LCV or CV) The total number of line code violations that have been detected during the measurement interval. An LCV is the occurrence of a Bi-polar Violation (BPV) or Excessive Zeros.

Show DS1 All

Purpose: This command provides an abbreviated list of showing the DS1 settings and current service status for all 32 DS1 circuits. It produces a message similar to the following, showing the circuit identifier, DS1 number, current status (up/down), and some common parameters of interest in trouble-shooting. (To obtain a detailed list for a specific DS1 or range of DS1s, use the **`show ds1`** *<n>* command.)

Security: Level 3 (monitor)

Syntax: **`show ds1 all`**

Message:

```
Remote
                                                    Line         Term        Device
  Circuit ID                          Link Type     Code Framing  ID   FDL    Mgmt
  ----------                         ---- ------ ---- ------- ---- -----  ------
  CA DS1# 01                         UP   DROP   B8ZS   ESF        None   CA IP
  CA DS1# 02                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 03                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 04                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 05                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 06                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 07                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 08                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 09                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 10                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 11                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 12                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 13                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 14                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 15                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 16                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 17                         DOWN DROP   B8ZS   ESF        None   None
  CA DS1# 18                         DOWN DROP   B8ZS   ESF        None   None
```


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```
CA DS1# 19                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 20                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 21                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 22                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 23                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 24                    DOWN DROP   B8ZS   ESF         None   None
CA DS1# 25                    DOWN SWITCH B8ZS   ESF    1    None   None
CA DS1# 26                    DOWN SWITCH B8ZS   ESF    3    None   None
CA DS1# 27                    DOWN SWITCH B8ZS   ESF    4    None   None
CA DS1# 28                    DOWN SWITCH B8ZS   ESF    5    None   None
CA DS1# 29                    DOWN SWITCH B8ZS   ESF    2    None   None
CA DS1# 30                    DOWN SWITCH B8ZS   ESF    6    None   None
CA DS1# 31                    DOWN SWITCH B8ZS   ESF    7    None   None
CA DS1# 32                    UP   GROOM  B8ZS   ESF         None   None
```

Description:

Item	Description
Circuit ID	Circuit identifier set by user for the DS1 number.
Link	Link service status: UP, DOWN.
Type	DROP, GROOM, SWITCH. Switch type appears only with GR-303 option.
Linecode	AMI, B8ZS.
Framing	D4 (SF), ESF, SLC96 (S4).
TermID	Line termination identifier, 1 to 28, set by user. (Used in GR-303 communications to specify switch DS1.)
Remote Device MGMT	NONE, CAFDL, CAIP <ipaddress>, DS1 <n>.
FDL Type	NONE, SLC96 (DDL), T1403 (ANSI T1.403). Switch DS1 FDL type is always None.

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Show EOC

Purpose: Displays the current primary and secondary TMC locations.

Security: Level 3 (monitor)

Syntax: **`show eoc`**

Message:

```
EOC Settings:
Primary:    DS1 #25 channel 12
Secondary:  DS1 #29 channel 12
```

Description:

Item	Description
Primary	Primary EOC. The default is DS1 #25, DS0 #12.
Secondary	Secondary EOC. The default is DS1 #29, DS0 #12.

Show Ethernet

Purpose: Displays the Ethernet media access control (MAC) address, as well as the Ethernet IP address and mask. which is the physical network address of the Ethernet port. The MAC address is the physical network address of the Ethernet port. It is fixed by hardware and can not be changed.

Security: Level 3 (monitor)

Syntax: **`show ethernet`**

Message:

```
IP Address and Mask:     192.168.118.65 255.255.255.0
MAC Address:             00-E0-97-00-08-37
```

Description:

Item	Description
IP Address	Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *xxx.xxx.xxx.xxx*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type **none** for the IP address.

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Item	Description
Mask	The Access Navigator uses a subnet mask to identify the permissible range of addresses for each IP address. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Subnet masks have the format *xxx.xxx.xxx.xxx*, where each xxx is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *255.255.0.0* and *255.255.255.0*. If a subnet mask is not used, type **none** or leave blank.
MAC Address	The Ethernet media access control (MAC) address is a hexadecimal number such as *00-E0-97-00-08-37*.

Show ID

Purpose: Displays the System Identifier assigned to the Access Navigator. This is a name, location, or Telcordia (Bellcore) CLLI code. It is a text string, such as "Acme Corp. AN#2" or "DNVRCO1A201". The System Identifier also appears in the command line prompt. The default System Identifier is "Access Navigator" so the command prompt will be "Access Navigator>". When you change the identifier, the prompt will also change.

Security: Level 3 (monitor)

Syntax: **`show id`**

Message: `ID: Access Navigator`

Show Interface

Purpose: Displays the settings for one interface name, or for all interfaces defined for DS1s in the Access Navigator. Use the **`set interface`** command to change settings.

NOTE: CLI provides three commands for displaying DS1 interface information: **`show interface`**, **`status interface`**, and **`read remote connect`**. The first displays provisioning information stored in the Access Navigator data base, while the second displays the current service status. The last command reads and displays current interface settings from the remote Access Bank II data base (see "Read Remote Connections" on page 18-48). Interface connections must be provisioned in the Access Navigator before the configuration settings can be downloaded to the remote Access Bank II.

Security: Level 3 (monitor)

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Syntax: **show interface** <"*name*"|**all**>

Field	Description
name	The user defined name for the interface. The name must be enclosed in quotes.
all	Display settings for all fractional interfaces.

Example: **show interface "AcmeT1"**

Example: **show interface all**

NOTE: The first two messages below are typical for DS1 connections to a remote port. The third message is typical for internal crossconnections from the remote T1 Drop to another remote port.

Message:

```
Settings for Interface "AcmeT1"
     Interface Channels:     9:13-18
     Remote Port:            T1Drop
     Interface Type:         Voice
```

Message:

```
Settings for Interface "AcmeV35"
     Interface Channels:     9:19-24
     Remote Port:            V35
     Interface Type:         Data
```

Message:

```
Settings for Interface "AcmeRemote"
     DS1:                    9
     T1Drop Channels:        11-12
     Remote Port:            FX
     Interface Type:         Remote
```

Description:

Item	Description
Interface Channels	DS1 number, 1 to 32, and range of DS0 numbers such as 5-8. (DS1 is the remote terminal number.)
Remote Port	FX, RS-232, T1 Drop, V.35. (FX only applies to “Remote” interface type.)
Interface Type	Voice, Data, GR-303, Remote.
DS1	DS1 number, 1 to 32, of remote terminal.
T1Drop Channels	Range of DS0 numbers on T1 Drop to be connected to Remote Device port.

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Show IP

Purpose: The Ethernet port on the Access Navigator provides an Internet Protocol (IP) interface. Currently, the **`show ip`** and **`status ip`** commands produce the same message, listing the IP address and subnet mask, and the gateway address.

Security: Level 3 (monitor)

Syntax: **`show ip`**

Message:

```
IP Address and Mask:          192.168.3.158  255.255.255.0
IP Address of the Gateway:    192.168.3.202
```

Description:

Field	Description
IP Address	Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *`xxx.xxx.xxx.xxx`*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type **none** for the IP address.
IP Mask	The Access Navigator uses a subnet mask to identify the permissible range of addresses for each IP address. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Subnet masks have the format *`xxx.xxx.xxx.xxx`*, where each xxx is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *`255.255.0.0`* and *`255.255.255.0`*. If a subnet mask is not used, the field will be blank.
IP Address of Gateway	Gateway addresses have the format *`xxx.xxx.xxx.xxx`*, where each xxx is a decimal number between 0 and 255. If a gateway address is not used, the value is none.

Show ISDN CRV

Purpose: Displays a message listing the status of the specified ISDN BRI channels. To display the ISDN BRI channels, you must enter a CRV or range of CRVs.

NOTE: The **`show ds0`** command lists ISDN and CRV information by channel number rather than CRV. See *Show DS0* on page 18-139.

Security: Level 3 (monitor)

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Syntax: **show isdn crv** <*range*>

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **show isdn crv 6**

Example: **show isdn crv 1-8**

Message:

```
CRV     B1                B2                D
------  ------------      ------------      ------------
1       10:1              10:2              10:24
2       10:3              10:4              10:24
3       10:5              10:6              10:24
4       10:6              10:8              10:24
5       not assigned      not assigned      10:23
6       not assigned      not assigned      10:23
7       CRV not assigned to ISDN
8       CRV not assigned to ISDN
```

Description:

Item	Description
CRV	Call Reference Value, 1 to 768
B1	Bearer channel 1 status
B2	Bearer channel 2 status
D	Signaling channel status
Status	The following states may appear in B1, B2, D columns: Numbers – indicate DS1:DS0 channel assignments Not Assigned – CRV is not assigned to a DS0 CRV not assigned to ISDN – Use **show crv** command for additional information

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Show Remote

Purpose: Displays the port settings for the remote Access Bank II at the far end of the DS1. Use the **`set remote`** command to change port settings.

Security: Level 3 (monitor)

Syntax: **`show remote`** <*n*|**`all`**>

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
all	Display all DS1 remote interfaces.

Example: **`show remote 9`**

Example: **`show remote 1-5`**

Example: **`show remote all`**

Message:

```
Settings for remote device Remote Device #11:
  Remote Config:      enabled
  T1 Drop Port:
    Line Coding:      AMI
    Framing:          D4
    Line Build Out:   DSX-1 0-133 ft. (or 0 db)
    PRM:              AT&T
  V.35 Port:
    CTS:              Always High
    Rx Timing:        Internal
    Clock Inversion:  None
    Data Inversion:   Normal
    Speed:            Nx64
    DSU:              On
  RS232 Port:
    Baud Rate:        9,600
    Data Bits:        8
    Parity:           None
    Stop Bits:        1
```

Description:

Item	Description
Remote Config	enabled (on), disabled (off)
T1 Drop Port:	
Line Coding	AMI, B8ZS
Framing	D4 (SF), ESF

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Item	Description
Line Build Out	DSX-1 equalization (ft.), CSU attenuation (dB)
PRM	Performance messages: AT&T 54016, ANSI T1.1403
V.35 Port:	
CTS	Always High, Always Low, Follow CD, Follow RTS
Rx Timing	Internal, External
Clock Inversion	None, Rx, Tx, Rx and Tx
Data Inversion	None, Invert
Speed	Data speed (Kbps): Nx56 or Nx64, where N is number of DS0s assigned
DSU	V.54 Data Service Unit (DSU) loopcode detection: On, Off
RS232 Port:	
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600
Data Bits	7, 8
Parity	None, Odd, Even
Stop Bits	1, 2

Show Remote Connections

Purpose: Displays crossconnections between interfaces inside the remote Access Bank II, including the T1 connection to the Access Navigator DS1.

NOTE: The **`show remote`** commands display the settings stored in the Access Navigator's data base, while the **`read remote`** commands show the actual settings of the remote device. Both commands should display the same settings when remote configuration is enabled so the Access Navigator can provision the remote Access Bank II. *Set Remote Config* on page 18-119

Security: Level 3 (monitor)

Syntax: **`show remote`** <*n*> **`connections`**

Field	Description
n	DS1 number, 1 to 32.

Example: **`show remote 9 connections`**

This command produces a message similar to the following. The message shows static connections between each span and channel as a table, where the span is the interface and the channel is the DS0.

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NOTE: An Access Navigator DS1 may connect to either T1 port of the Access Bank II. The following message example shows that the Access Navigator DS1 is connected to T1#2 of the Access Bank II, so that T1#1 becomes the T1Drop port. No DS0 channels are currently connected to T1#1.

NOTE: In the Access Bank II/SDSL, the SDSL port replaces T1#2.

Each row and column represents one end of the connection (row is span, column is channel). Note that some spans have two rows of channels, with channels 1 to 12 in the first row and channels 13 to 24 in the second row.

The table entry at the row-column intersection represents the other end of the connection (span:channel). Each interface name in the first column has a span number shown in parentheses. For example, FX#2 (4) means the FX#2 is span number 4, so the entry "4:2" means span 4 channel 2. Table entries with the letters "n/c" have "no connection."

In the message example below, row T1#2 (2) and column CH 13 represent span 2 channel 13. The corresponding table entry is "4:1", which represents span 4 channel 1. Therefore, T1#2 channel 13 connects to FX#2 channel 1. Similarly, the entry for row FX#2 and column CH 1 is "2:13", which indicates a connection to T1#2 channel 13.

Message:

```
Static Connections:

CH       1     2     3     4     5     6     7     8     9     10    11    12
         13    14    15    16    17    18    19    20    21    22    23    24
Span
----    ------------------------------------------------------------------------
T1#1(1)  n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c
         n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c

T1#2(2)  3:1   3:2   3:3   3:4   3:5   3:6   3:7   3:8   3:9   3:10  3:11  3:12
         4:1   4:2   4:3   4:4   4:5   4:6   4:7   4:8   4:9   4:10  4:11  4:12

FX#1(3)  2:1   2:2   2:3   2:4   2:5   2:6   2:7   2:8   2:9   2:10  2:11  2:12

FX#2(4)  2:13  2:14  2:15  2:16  2:17  2:18  2:19  2:20  2:21  2:22  2:23  2:24

V35(5)   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c
         n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c   n/c

RS232(6) n/c

Note: #:# = span:channel
      n/c = no connection
```


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Description:

Item	Description
CH	Channel numbers in two rows, 1-12 and 13-24.
Span	Interface name (span number). T1#1(1) – T1 interface #1, with up to 24 channels. T1#2(2) – T1 interface #2, with up to 24 channels. SDSL(2) – SDSL interface, with up to 16 channels. FX#1(3) – FX card #1, with up to 12 channels. FX#2(4) – FX card #2, with up to 12 channels. V35(5) – V.35 interface, with up to 24 channels. RS232(6) – RS-232 port, with one channel.

Show SNMP

Purpose: Displays the current snmp settings. To protect management access, the Community names can only be viewed and changed by CLI commands.

Simple Network Management Protocol (SNMP) enables network operations centers (NOCs) to monitor and manage network elements across an internetwork. The Access Navigator supports SNMP through its Ethernet port. Various **set snmp** commands are used to set up the Access Navigator for access by the carrier's TCP/IP management network.

Security: Level 3 (monitor)

Syntax: **`show snmp`**

Message:

```
System Name:            Acme Corp AN#2
System Location:        DNVRCO1A201
System Contact:         Site Manager
GET Community:          public
SET Community:          public
TRAP Community:         public
NMS #1:                 192.168.0.65
NMS #2:
NMS #3:
```

Description: System name, location, contact, and communities are text strings. Up to three Network Management System (NMS) stations can receive trap messages at their IP address.

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Show Switch

Purpose: Displays the current switch setting, use the following command.

Security: Level 3 (monitor)

Syntax: **`show switch`**

Message:

```
Switch setting: 5ESS
```

Switch Setting	Description
5ess	Lucent 5ESS
dms	Nortel DMS
generic	Generic switch defined in Telcordia (Bellcore) generic TR-303 specification, Supplement 3 EOC definition)

Show Time

Purpose: Display Access Navigator system clock time. Time format is 24-hour clock in hours:minutes:seconds.

Security: Level 3 (monitor)

Syntax: **`show time`**

Message:

```
08:30:45
```

Show TMC

Purpose: Shows the current primary and secondary TMC locations.

Security: Level 3 (monitor)

Syntax: **`show tmc`**

Message:

```
TMC Settings:
Primary:    DS1 #25 channel 24
Secondary:  DS1 #29 channel 24
```

Item	Description
Primary	Primary TMC. Default is DS1 #25, DS0 #24.
Secondary	Secondary TMC. Default is DS1 #29, DS0 #24.

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Show Users

Purpose: Shows current user settings and status.

NOTE: Normally a user logs in once to start a management session, then logs off when done (**`exit`** command). The system allows the same user name to be "logged in" more than once. The total number of simultaneous sessions by all users can not exceed 3, comprising a maximum of 1 RS-232 session and 2 Telnet sessions.

Security: Level 3 (monitor)

Syntax: **`show users`**

The following is a typical message showing four users. Alice and Bill have level 1 (manager) access. Carl Smith has level 2 (operator) access. And Dave46 has level 3 (monitor) access. The message also gives the current login status and the time and date that each user last logged into the system.

Message:

```
User           Level  Logged in  Last Login
----           -----  ---------  ----------
alice            1       1       09:28:37 11/23/1998
bill             1       2       14:06:25 11/17/1998
carlsmith        2       0       11:17:45 11/22/1998
dave46           3       0       12:14:33 11/20/1998
```

Description:

Item	Description
User	User names of people with access to the system.
Level	User access level: manager (1), operator (2), monitor (3).
Logged in	Number of active management sessions, 0 to 3.
Last Login	Time and date that user last logged into the system.

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Status Clock

Purpose: Displays the currently active clock source, along with the primary and secondary clock settings and clock source status.

Security: Level 3 (monitor)

Syntax: `status clock`

Message:

```
Active Clock Source: DS1 12

Primary:
 Clock Source:   DS1 12
 Clock Status:   In Service
Secondary:
 Clock Source:   INTERNAL
 Clock Status:   In Service
```

Description:

Item	Description
Active Clock Source	Indicates the Clock Source currently being used.
Primary	Indicates clock source to use for normal operation.
Secondary	Indicates clock source to use if primary clock source fails.
Clock Source	DS1 number – DS1 clock recovered by receiver. BITS – External Building Integrated Timing Supply. INTERNAL – internal Stratum clock oscillator.
Clock Status	In Service – working. Out of Service – not working.

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Status CRV

Purpose: Displays the status of the specified CRV number.

NOTE: In the following command, there can be up to 24 CRVs in a range, such as 1-24 or 110-134. The CRVs do not have to be on the same DS1.

Security: Level 3 (monitor)

Syntax: **`status crv`** *<range>*

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **`status crv 10`**

Example: **`status crv 5-8`**

Message:

```
CRV     Status            Call Status
---     ------            -----------
4       Not Assigned
5       In Service        Active
6       In Service        Active
7       In Service        Idle
8       In Service        Permanent
9       Assigned to ISDN
```

Description:

Item	Description
CRV	Call reference value, 1 to 768
Status	The following states may occur: Not Assigned Not Available Assigned to ISDN In Service User set Out of Service Switch set Out of Service Card not Installed Facility failure DS1 Out of Service
Call Status	The following states may occur when CRV is In Service: Active – Call in progress (off hook) Idle – Line available (on hook) Permanent – Line not available because of permanent off-hook state

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Status DS0

Purpose: Displays the status for each DS0 specified (up to 24).

Security: Level 3 (monitor)

Syntax: **`status ds0`** *<n:ch>*

Field	Description
n	DS1 number, 1 to 32.
ch	DS0 number, 1 to 24, or a range of numbers such as 5-8.

Example: **`status ds0 32:1-4`**

Shows status of DS1 #1, DS0 channels 1 to 4. The message would look similar to the following:

Message:

```
Interface                 Status
---------                 ------
DS1 1 Channel 1           In Service
DS1 1 Channel 2           In Service
DS1 1 Channel 3           In Service
DS1 1 Channel 4           User set Out of Service

DS1 32 Channel 1          Card Not Installed
DS1 32 Channel 2          Card Not Installed
DS1 32 Channel 3          Card Not Installed
DS1 32 Channel 4          Card Not Installed
```

Description:

Item	Description
Interface	Lists DS1 number and DS0 channel number.
Status	In Service – DS0 is up User set Out of Service – User set DS0 down Card Not Installed – Empty card slot (CLI also displays alarm messages.)

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Status DS1

Purpose: Displays a detailed DS1 service status message. (For a short status summary, use the **`status ds1 all`** command.)

Security: Level 3 (monitor)

Syntax: **`status ds1`** *<n>*

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 12`**

Example: **`status ds1 1-4`**

Message:

```
Status for DS1 1:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   None
    Remote Device Mgmt Type:    CA FDL
    Remote Device Mgmt Status:  In Service

Status for DS1 2:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   T1403
    Remote Device Mgmt Type:    None

Status for DS1 3:
    Receive:                    Traffic
    Transmit:                   Traffic
    Loop:                       None
    State:                      In use as DROP
    FDL Type:                   None
    Remote Device Mgmt Type:    None

Status for DS1 4:
    Receive:                    Loss of Signal
    Transmit:                   RAI/Yellow Alarm
    Loop:                       None
    State:                      User set Out of Service
    FDL Type:                   None
    Remote Device Mgmt Type:    None
```


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Description:

Item	Description
Receive	Traffic – normal operation. (The CLI also shows alarm conditions.)
Transmit	Traffic – normal operation. (The CLI also shows alarm conditions.)
Loop	None – normal operation.Line – line loopback. Payload – payload loopback.
State	In use as DROP – Subscriber “drop” DS1. In use as GROOM – DCS “groom” DS1. In Service – GR-303 “switch” DS1. User set Out of Service – User set DS1 down. Card Not Installed – Empty card slot (The CLI also displays alarm messages such as RAI.)
FDL Type	None – No detection or response (only option for switch DS1s). SLC96 – Required for Shelf A of SLC-96/TR-08 group. T1403 – Detects and responds to ANSI T1.403 codes. (See *Set DS1 FDL* on page 18-106.)
`Remote Device Mgmt Type`	None – no management CA FDL – Used to provision remote Access Bank II or establish pass-through management session to Adit 600. CA IP <*ipaddress*> – Used for IP DS0 management of remote Adit 600. CA DS1 <*n*> – Used for IP DS0 management of remote Adit 600. (See *Set DS1 Remote Device Mgmt* on page 18-113.)
Remote Device Mgmt Status	Up or Down – Shown only if Remote Device Mgmt Type is CA IP or CA FDL.

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Status DS1 All

Purpose: Displays an abbreviated list showing the status for all 32 DS1 circuits. It produces a message similar to the following, showing the DS1 number, current status, and some common parameters of interest in trouble-shooting. (To obtain a detailed list for a specific DS1 or range of DS1s, use the **status ds1** <*n*> command.)

Security: Level 3 (monitor)

Syntax: **status ds1 all**

Message:

```
                                                                  Clock
DS1 Status                      FDL   Remote Device Management   Source
--- --------------------------  -----  ------------------------  ---------
 1  In use as DROP              None   CA FDL  In Service
 2  User set Out of Service     T1403  None    n/a
 3  In use as DROP              None   None    n/a
 4  In use as DROP              None   None    n/a
 5  In use as DROP              None   None    n/a
 6  In use as DROP              None   None    n/a
 7  In use as DROP              None   None    n/a
 8  In use as DROP              None   None    n/a
 9  In use as DROP              SLC96  None    n/a
10  In use as DROP              None   CA IP   In Service
11  In use as DROP              None   DS1 10  n/a
12  In use as DROP              None   None    n/a
13  In use as DROP              None   None    n/a
14  In use as DROP              None   None    n/a
15  In use as DROP              None   None    n/a
16  In use as DROP              None   None    n/a
17  In use as DROP              None   None    n/a
18  In use as DROP              None   None    n/a
19  In use as DROP              None   None    n/a
20  Facility failure            None   None    n/a
21  In use as GROOM             None   None    n/a
22  In use as GROOM             None   None    n/a
23  User set Out of Service     None   None    n/a
24  User set Out of Service     None   None    n/a
25  In Service                  None   None    n/a               Primary
26  In Service                  None   None    n/a
27  In Service                  None   None    n/a
28  In Service                  None   None    n/a
29  In Service                  None   None    n/a               Secondary
30  In Service                  None   None    n/a
31  User set Out of Service     None   None    n/a
32  User set Out of Service     None   None    n/a
```

Description:

Item	Description
DS1	DS1 number, 1 to 32

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Item	Description
Status	In use as DROP – Subscriber “drop” DS1. In use as GROOM – DCS “groom” DS1. In Service – GR-303 “switch” DS1. User set Out of Service – User set DS1 down. Card Not Installed – Empty card slot (The CLI also displays alarm messages such as RAI.)
FDL	None – No detection or response (default for switch DS1s). CAC – Required to provision remote Access Bank II. SLC96 – Required for Shelf A of SLC-96/TR-08 group. T1403 – Detects and responds to ANSI T1.403 codes.
Remote Device Management	n/a – not applicable CA FDL – Used to provision remote Access Bank II or establish pass-through management session to Adit 600. CA IP – Used for IP DS0 management of remote Adit 600. CA DS1 <*n*> – Used for IP DS0 management of remote Adit 600. In Service – Management link is in service (up) Out of Service – Management link is out of service (down). (See *Set DS1 Remote Device Mgmt* on page 18-113.)
Clock Source	Indicates Primary or Secondary if DS1 line receiver is used for master clock source

Status DS1 Performance

Purpose: Displays current performance data for the specified DS1. The Access Navigator accumulates DS1 performance data for the parameters described in RFC 1406 – *Definitions of Managed Objects for the DS1 and E1 Interface Types*. All performance parameters are accumulated in fifteen minute intervals. The “current” 15 minute interval shows data collected when the command is received, and always represents an elapsed time of less than 15 minutes. At the end of each 15 minute interval, the Access Navigator displays the total as the “previous” 15 minute interval and computes new totals for 1 hour and 1 day by summing previous intervals.

Each DS1 has its own interval timer (not the system clock) that controls all measurement intervals. This timer counts from zero up to 24 hours, then rolls over and starts at zero again. This timer is reset by a power-on reset or **`reset all`** command. To see data for the most recent 96 intervals, see *Status DS1 Performance History* on page 18-165.

NOTE: The **`clear performance`** command can be used to reset the performance data for a specific DS1. When this is done, the timer for that DS1 will start at zero hours, minutes, and seconds. (See “Clear DS1 Performance” on page 18-27.)

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The **`status performance`** message will include an asterisk (*) to mark error counts that exceed the threshold values set by the *Set DS1 Threshold* on page 18-115. Exceeding a threshold can cause an automatic alarm message to be sent to the network operations center.

Security: Level 3 (monitor)

Syntax: **`status ds1 <n> performance`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 9 performance`**

Message:

```
Performance Statistics for DS1 #9
                                 current  previous
                                15 min.   15 min.     hour       day
                               --------  --------  --------  --------
unavailable seconds:                  0         0         0         0
errored seconds:                      1         0       577*    29377*
severely errored seconds:             0         0         0         0
sev. errored frame seconds:           0         0         0         0
line errored seconds:                 1         0         0         0
controlled slip seconds:              0         0         0         0
bursty errored seconds:               1         0         0         0

degraded minutes:                     0         0         0         0
line code violations:                 3         0         0         0
path code violations:                 1         0         0         0

elapsed time in current 15 min. interval:  4:25
valid 15 min. intervals in hour:              3
valid 15 min. intervals in day:              35
* indicates threshold has been exceeded.
```

Description:

Item	Description
Unavailable Seconds	(UAS) The number of seconds that the interface is unavailable. The DS1 interface is said to be unavailable from the onset of 10 contiguous SESs, or the onset of the condition leading to a failure. If the condition leading to the failure was immediately preceded by one or more contiguous SESs, then the DS1 interface unavailability starts from the onset of these SESs.

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Item	Description
Errored Seconds	(ES) For ESF links, the number of one-second intervals containing one or more Path Code Violations OR one or more Severely Errored Frame defects OR one or more Controlled Slip events OR a detected AIS defect. For D4 links, the presence of Bipolar Violations also triggers an Errored Second. ES is not incremented during an Unavailable Second.
Severely Errored Seconds	(SES) For ESF links, the number of one-second intervals containing 320 or more Path Code Violation Error Events OR one or more Out of Frame defects OR a detected AIS defect. For D4 signals, The number of one-second intervals with Framing Error events, or an OOF defect, or 1544 LCVs or more. Controlled slips are not included in this parameter. SES is not incremented during an Unavailable Second.
Severely Errored Frame Seconds	(SEFS) The number of one-second intervals containing one or more Out of Frame defects OR a detected AIS defect.
Line Errored Seconds	(LES) The number of one-second intervals containing one or more line errors.
Controlled Slip Seconds	(CSS) The number of one-second intervals containing one or more controlled slips.
Bursty Errored Seconds	(BES) Also known as Errored Second type B. The number of one-second intervals with fewer than 320 and more than 1 Path Coding Violation error event, no Severely Errored Frame defects, and no detected incoming AIS defects. Controlled slips are not included in this parameter. BES is not incremented during an Unavailable Second.
Degraded Minutes	(DM) The total number of minutes in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3. Degraded Minutes are determined by collecting all of the Available Seconds, removing any Severely Errored Seconds, grouping the result in 60-second long groups, and counting a 60-second long group (one minute) as degraded if the cumulative errors during the seconds present in the group exceed 1E-6. Available seconds are merely those seconds that are not Unavailable (UAS).
Line Code Violations	(LCV or CV) The total number of line code violations that have been detected during the measurement interval. An LCV is the occurrence of a Bi-polar Violation (BPV) or Excessive Zeros.

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Item	Description
Path Code Violations	(PCV) The total number of path code violations that have been detected during the measurement interval. For D4 signals, the PCV count is the number of frame bit errors. For ESF signals, the PCV count is the number of Cyclical Redundancy Count (CRC) errors and frame bit errors.
Elapsed time in current 15 min. interval	The time in minutes:seconds that have elapsed during the current 15 minute interval (determined by timer).
Valid 15 min. intervals in hour	The number of completed 15 minute intervals used for calculating 1-hour totals (determined by timer). Maximum value is 4.
Valid 15 min. intervals in day	The number of completed 15 minute intervals used for calculating 1-day totals (determined by timer). Maximum value is 96.
* indicates threshold value has been exceeded.	This text will appear when the error count exceeds the value set by the *Set DS1 Threshold* on page 18-115.

Status DS1 Performance History

Purpose: Displays a tabular list of performance data for the specified DS1 during each 15-minute interval and the count totals for the day. Performance history shows the most recent 96 intervals.

NOTE: The **`clear performance`** command can be used to reset the performance data for a specific DS1. When this is done, the timer for that DS1 will start at zero hours, minutes, and seconds. (See *Clear DS1 Performance* on page 18-27.)

Security: Level 3 (monitor)

Syntax: **`status ds1`** *<n>* **`performance history`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.

Example: **`status ds1 9 performance history`**

Message:

```
    Performance Statistics for DS1 #9

                    UAS   ES  SES SEFS  LES  CSS  BES   DM     LCV     PCV
                   ---- ---- ---- ---- ---- ---- ---- ---- ------- -------
  curr. interval:     0  822    0    0    0    0  822   13       0       0
```


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```
prev. intvl  1:     0  900    0    0    0    0  900   15       0       0
prev. intvl  2:     0  900    0    0    0    0  900   15       0       0
prev. intvl  3:     0  900    0    0    0    0  900   15       0       0
prev. intvl  4:     0  900    0    0    0    0  900   15       0       0
prev. intvl  5:     0  900    0    0    0    0  900   15       0       0
prev. intvl  6:     0  577    0    0    0    0  577   10       0       0
prev. intvl  7:     0    0    0    0    0    0    0    0       0       0
prev. intvl  8:     0    0    0    0    0    0    0    0       0       0
prev. intvl  9:     0    0    0    0    0    0    0    0       0       0
prev. intvl 10:     0    0    0    0    0    0    0    0       0       0

prev. intvl 94:     0    0    0    0    0    0    0    0       0       0
prev. intvl 95:     0    0    0    0    0    0    0    0       0       0
prev. intvl 96:     0    0    0    0    0    0    0    0       0       0
               ==== ==== ==== ==== ==== ==== ==== ==== ======= =======
totals:             0 5899    0    0    0    0 5899   88       0       0

elapsed time in current 15 min. interval:  13:42
valid 15 min. intervals in hour:               3
valid 15 min. intervals in day:               96
```

Description:

NOTE: See detailed descriptions in *Status DS1 Performance* on page 18-162.

Item	Description
UAS	Unavailable Seconds
ES	Errored Seconds
SES	Severely Errored Seconds
SEFS	Severely Errored Frame Seconds
LES	Line Errored Seconds
CSS	Controlled Slip Seconds
BES	Bursty Errored Seconds
DM	Degraded Minutes
LCV	Line Code Violations
PCV	Path Code Violations
Elapsed time in current 15 min. interval	The time in minutes:seconds that have elapsed during the current 15 minute interval (determined by timer).
Valid 15 min. intervals	The number of completed 15 minute intervals used for calculating totals (determined by timer). Maximum value is 96.

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Status EOC

Purpose: Displays detailed EOC service status message.

Security: Level 3 (monitor)

Syntax: **`status eoc`**

Message:

```
EOC Status:
 Primary
   Channel:       DS1 #25 channel 12
   Link Status:   Up
   Mode:          Active
 Secondary
   Channel:       DS1 #29 channel 12
   Link Status:   Up
   Mode:          Standby
```

Description:

Item	Description
Channel	Location of EOC, by DS1 and DS0 number.
Link Status	Up – indicates LAPD communications link with switch is established and healthy. Down – out of service. None – no link defined.
Mode	Active or Standby – One EOC is active and the other is in standby. If the active EOC fails, the switch will command the standby EOC to become active.

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Status Equipment

Purpose: Displays the status of all cards installed in the Access Navigator. Adding the optional parameter "all" will display the complete versions of the system software components, as shown in the example on the next page.

Security: Level 3 (monitor)

Syntax: `status equipment [all]`

Example: `status equipment`

Message:

```
Equipment        Status                Version
---------        ------                -------
Controller A     Active                01.77 GR-303 Option
Controller B     Standby               01.77 GR-303 Option
DS1 Card 1       Installed                1
DS1 Card 2       Installed                1
DS1 Card 3       Installed                1
DS1 Card 4       Installed                1
DS1 Card 5       Installed                1
DS1 Card 6       Installed                1
DS1 Card 7       Card not installed       1
DS1 Card 8       Card not installed       1
```

Description:

Item	Description
Equipment	Lists card type and card slot. Controller - Slots A and B only. DS1 Card - Slots 1 through 8 only.
Status	Active - The Controller card is active. Standby - The Controller card is in standby. Unknown - Card installed but not responding. Installed - Card installed. Card Not Installed – Empty card slot. Card Failed - transient message indicating standby Controller failed software update and will reboot.
Version	Controller - Firmware version number plus software options such as GR-303 or GR-303 P-Phone. DS1 Card - Version number of card.

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Example: **`status equipment all`**

Message:

```
Equipment         Status                 Version
---------         ------                 -------
Controller A      Active                 01.77 GR-303 Option
Controller B      Standby                01.77 GR-303 Option
DS1 Card 1        Installed                 1
DS1 Card 2        Installed                 1
DS1 Card 3        Installed                 1
DS1 Card 4        Installed                 1
DS1 Card 5        Installed                 1
DS1 Card 6        Installed                 1
DS1 Card 7        Card not installed        1
DS1 Card 8        Card not installed        1

                                  Active     Standby
                                  ------     -------
   SW Build Number                17701      17701
   Boot Code Revision             01.09      01.07
   FPGA Code Revision             1.06       1.06
```

Description:

Item	Description
Equipment	Lists card type and card slot. Controller - Slots A and B only. DS1 Card - Slots 1 through 8 only.
Status	Active - The Controller card is active. Standby - The Controller card is in standby. Unknown - Card installed but not responding. Installed - Card installed. Card Not Installed – Empty card slot. Card Failed - transient message indicating standby Controller failed software update and will reboot.
Version	Controller - Firmware version number plus software options such as GR-303 or GR-303 P-Phone. DS1 Card - Version number of card.
SW Build Number	Application code software build number
Boot Code Revision	Boot code version number
FPGA Code Revision	Firmware code version number

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Status IP

Purpose: The Ethernet port on the Access Navigator provides an Internet Protocol (IP) interface. Currently, the **`show ip`** and **`status ip`** commands produce the same message, listing the IP address and subnet mask, and the gateway address.

Security: Level 3 (monitor)

Syntax: **`show ip`**

Message:

```
IP Address and Mask:          192.168.3.158  255.255.255.0
IP Address of the Gateway:    192.168.3.202
```

Description:

Field	Description
IP Address	Each Access Navigator on the same Ethernet network must have a unique static Internet Protocol (IP) address. IP addresses have the format *`xxx.xxx.xxx.xxx`*, where each *xxx* is a decimal number between 0 and 255. For example, *192.168.0.123* is a valid IP address. Note that the address contains only three periods, one between each of the four numbers. If the Ethernet interface is not used, type **none** for the IP address.
IP Mask	The Access Navigator uses a subnet mask to identify the permissible range of addresses for each IP address. Large networks are usually divided into smaller subnetworks, each with an assigned range of IP addresses. Subnet masks have the format *`xxx.xxx.xxx.xxx`*, where each xxx is a decimal number between 0 and 255. Subnet masks usually start with one or more groups of 255. Typical examples include *`255.255.0.0`* and *`255.255.255.0`*. If a subnet mask is not used, the field will be blank.
IP Address of Gateway	Gateway addresses have the format *`xxx.xxx.xxx.xxx`*, where each xxx is a decimal number between 0 and 255. If a gateway address is not used, the value is none.

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Status ISDN CRV

Purpose: Displays a message listing the status of the specified ISDN BRI channels. To display the ISDN BRI channels, you must enter a CRV or range of CRVs.

NOTE: The **status isdn crv** command only applies to ISDN BRI channels transported in the GR-303 4:1 TDM mode. Other ISDN BRI channels transported using the 3DS0 mode are set up as digital crossconnections that can be examined using the **status ds0** command.

Security: Level 3 (monitor)

Syntax: **status isdn crv** <*range*>

Field	Description
range	Call Reference Value, 1 to 768, or a range of values such as 15-18. Maximum range is 24 CRVs.

Example: **status isdn crv 6**

Example: **status isdn crv 1-4**

Message:

```
CRV  Chan  Status              Call Status
---  ----  ------              -----------
1    B1    In Service          Active
1    B2    In Service          Active
1    D     In Service          n.a.
2    B1    In Service          Idle
2    B2    In Service          Idle
2    D     In Service          n.a.
3    B1    In Service          Idle
3    B2    In Service          Idle
3    D     In Service          n.a.
4    B1    User set Out of Service
4    B2    User set Out of Service
4    D     User set Out of Service
```

Description:

Item	Description
CRV	Call Reference Value, 1 to 768
Chan	B1 – Bearer channel 1 B2 – Bearer channel 2 D – Signaling channel

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Item	Description
Status	The following states may appear: Not Assigned Not Assigned to ISDN Not Available In Service User set Out of Service Switch set Out of Service Under user test control In Loopback Card not Installed Facility failure DS0 is not a drop side GR303 channel DS1 Out of Service
Call Status	The following states may occur when CRV is In Service: Active – Call in progress (off hook) Idle – Line available (on hook) Permanent – Line not available because of permanent off-hook state n.a. – not applicable

Status Remote

Purpose: Displays a message listing the remote terminals at the far end of the DS1s. The command syntax lets the operator request a specific DS1, range of DS1s, or all DS1s. The Access Navigator can identify Carrier Access remote terminals, such as the Access Bank II and Adit 600, over the DS1 FDL channel.

Security: Level 3 (monitor)

Syntax: **`status remote <`***`n`***`|all>`**

Field	Description
n	DS1 number, 1 to 32, or a range of numbers such as 2-8.
all	Display all DS1 remote interfaces.

Example: **`status remote all`**

Example: **`status remote 1`**

Example: **`status remote 1-7`**

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Message:

```
DS1  Terminal              ID                     Status
---  --------------------  ---------------------  -------------
  1  CA Adit 600           Remote Device #1       In Service as CA IP
                                                  In Service as PPHONE
  2  n/a                   n/a                    FDL Not Used
  3  CA Access Bank I      Remote#3               In Service as CAC
  4  CA Access Bank II     Remote#4               In Service as CAC
  5  CA Adit 600           Remote#5               In Service as CA FDL
  6  Unknown               Unknown                In Service as T1403
  7  Unknown               n/a                    Facility failure
```

Description:

Item	Description
DS1	DS1 number, 1 to 32
Terminal	n/a – (not applicable) FDL is not being used. CA Access Exchange CA Access Bank I CA Access Bank II CA Adit 600 Unknown – FDL is being used by unknown terminal.
ID	Remote Terminal Identifier
Status	In Service as CA FDL – FDL is up and using FDL protocol. In Service as CA IP – DS0 link is up and using CA IP protocol. Negotiating IP Link – Trying to establish CA IP link. Facility Failure – CA IP link can not be established. In Service as PPHONE – P-Phone call connection is enabled. In Service as T1403 – FDL is up and using ANSI T1.403. FDL Not Present – FDL protocol is set to "none". FDL In Progress – Transmitting. Facility failure – FDL is Out of Service.

Status TMC

Purpose: Provides detailed TMC service status message for the current 1-hour interval. (For status information for other hours, see *Status TMC History* on page 18-175.)

Security: Level 3 (monitor)

Syntax: **`status tmc`**

Message:

```
TMC Status:
  Primary
      Channel:          DS1 #25 channel 24
      Link Status:      Up
      Mode:             Active
```


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```
Secondary
    Channel:          DS1 #29 channel 24
    Link Status:      Up
    Mode:             Standby

                     Total          POTS           ISDN
                     -----          ----           ----
Active Calls:          206             0              0
Permanent Calls:         0             0              0
Peak Calls:            233             0              0
Terminating Calls:     104             0              0
Originating Calls:     102             0              0
Blocked Calls:           0
```

Item	Description
Primary	Primary TMC channel
Secondary	Primary TMC channel
Channel	Location of TMC, by DS1 and DS0 number.
Link Status	Up – indicates LAPD communications link with switch is established and healthy. Down – out of service. None – no link defined.
Mode	Active or Standby – One TMC is active and the other is in standby. If the active TMC fails, the switch will command the standby TMC to become active.
POTS	Number of Plain Old Telephone Service calls
ISDN	Number of Integrated Services Digital Network, Basic Rate Interface calls.
Active Calls	Number of currently active calls.
Permanent Calls	Number of calls currently set in a permanent off-hook state. This state will be cleared when an on-hook is observed for more than 400 milliseconds.
Peak Calls	Maximum number of calls at one time.
Terminating Calls	Number of calls terminating on subscriber drops at current time.
Originating Calls	Number of calls originating from subscriber drops at current time.
Blocked Calls	Number of calls blocked by Access Navigator or switch. Switch may also refuse call if line configuration is not correct. Blocking can occur because: • Switch side DS0s are not available for call request. • Switch is not configured for call request from CRV.

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Status TMC History

Purpose: Displays TMC call history for the last specified 1-hour interval, range of intervals, or all intervals (48 hours). The resulting messages are similar to the following. (For current status information, see *Status TMC* on page 18-173.)

Security: Level 3 (monitor)

Syntax: **`status tmc <all|`*`interval`*`|`*`range`*`>`**

Field	Description
all	Shows all TMC statistics for the last 48 hourly intervals.
interval	Shows TMC statistics for the specified hourly interval, 1 to 48.
range	Shows TMC statistics for a range of intervals, such as 8-12.

Example: **`status tmc all`**

Example: **`status tmc 8-12`**

Message:

```
TMC Calls History
   int#   date        time      permn.    blocked   peak      switch ports/
                                calls     calls     calls     percent used
   -----  ----------  --------  --------  --------  --------  -------------
   8      04/17/2000  11:48:47  0         0         37        140 / 26
   9      04/17/2000  10:48:47  0         0         85        140 / 61
   10     04/17/2000  09:48:47  0         17        140       140 / 100
   11     04/17/2000  08:48:47  0         0         118       140 / 84
   12     no data for this interval.
```

Description:

Item	Description
int#	One-hour intervals, numbered from 1 to 48.
Date	month/day/year
Time	24-hour clock in hours:minutes:seconds
Permanent Calls	Number of calls currently set in a permanent off-hook state. This state will be cleared when an on-hook is observed for more than 400 milliseconds. (Permanent calls can also be cleared as described in “Set CRV Idle” on page 18-97.)
Blocked Calls	Number of calls blocked by Access Navigator or switch. (To clear, see “Clear Peak Call Count” on page 18-28.) Switch may also refuse call if line configuration is not correct. Blocking can occur because: • Switch side DS0s are not available for call request. • Switch is not configured for call request from CRV.

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Item	Description
Peak Calls	Maximum number of calls at one time. (To clear, see "Clear Peak Call Count" on page 18-28.)
Switch Ports	Number of DS0 ports connected to the switch (excludes EOC and TMC DS0s).
Percent Used	Percentage of switch ports in use, rounded to nearest whole number.

Switch Controller

CAUTION! SWITCHING CONTROLLERS WILL DISRUPT CALL PROCESSING AND CALL DATA FLOW FOR A FEW MILLISECONDS, BUT NO ESTABLISHED CALLS WILL BE LOST.

Purpose: Transfers active control to the standby Controller card. This means the active card goes into standby, and the standby card becomes active. Switching will not occur if the standby Controller is missing or is not operational.

Security: Level 2 (operator)

Syntax: `switch controller`

Since the active card controls the CLI management session, the CLI will log the user out and terminate the session before switching to the standby card. When the user logs back in, the new session will be controlled by the now active Controller card.

Upload TFTP Config

CAUTION! CONFIGURATION FILES ARE NOT COMPATIBLE BETWEEN DIFFERENT SOFTWARE VERSIONS (INCLUDING OPTIONS SUCH AS DCS, GR-303, AND P-PHONE). SERVICE DISRUPTIONS CAN OCCUR IF A CONFIGURATION FILE CREATED BY ONE SOFTWARE VERSION IS DOWNLOADED TO AN ACCESS NAVIGATOR RUNNING A DIFFERENT VERSION.

Purpose: This is a Level 1 command that allows a network manager to read the Access Navigator configuration database from flash memory and save the settings in file format. This file may be used as a backup copy of the present configuration or as a template for downloading to other Access Navigators. Because the IP settings are not saved, the file can be used with any Access Navigator having the same DCS or GR-303 options. File transfer normally takes only a few seconds.

NOTE: To download a configuration database file to an Access Navigator, see *Load TFTP Config* on page 18-37.

Security: Level 1 (manager)

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Syntax: **`upload tftp config`** *<ipaddr> <"file"> <blocksize>*

Field	Description
tftp	Upload software via Internet TFTP. Trivial File Transfer Protocol (TFTP) allows a file to be sent over a network by specifying the server IP address. The configuration file must be written to a TFTP file server accessible by both the Telnet management terminal and the Access Navigator. Using an RS-232 or Telnet management session, the operator sends an **`upload config`** command to the Access Navigator, specifying the location of the TFTP server and the destination configuration file name to use. TFTP server capabilities, including time-out settings, must match the bandwidth of the network being used.
config	Configuration database.
ipaddr	IP address where configuration file is to be stored. (This is the IP address of the TFTP server.) IP address has format *xxx.xxx.xxx.xxx*, where *xxx* is a number from 0 to 255.
file	File name used to save the configuration data. The file and optional path must be enclosed in quotes, as in "C:\CONFIG\AN26". The default path is the root directory of the TFTP server.
blocksize	Transmission block size (optional), 512 to 8192. The default is 8192 bytes.

Example: **`upload tftp config 192.168.118.65 "C:AN26"`**

WhoAmI

Purpose: Shows the name and access level of the user who is logged into the Access Navigator from the current management terminal. It produces a message similar to that shown below.

Security: Level 3 (monitor)

Syntax: **`whoami`**

Message: `Logged in as user 'alice' (level 1)`

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APPENDIX A

EOC Interface

In this Chapter

- Overview ... A-2
- Managed Object Class Support ... A-4
- Actions ... A-17
- Notifications ... A-18

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Overview

The Access Navigator GR-303 complies with Telcordia® (Bellcore) standard GR-303. This specification describes a Digital Loop Carrier (DLC) system that operates on T1 circuits. GR-303 management uses an Embedded Operations Channel (EOC) enabling the local switch to provision GR-303 resources in the Access Navigator. The local switch uses the Timeslot Management Channel (TMC), a dedicated DS0 channel, to set up cross-connects in the Access Navigator on a per-call basis, providing call concentration and more efficient use of switch and facility resources.

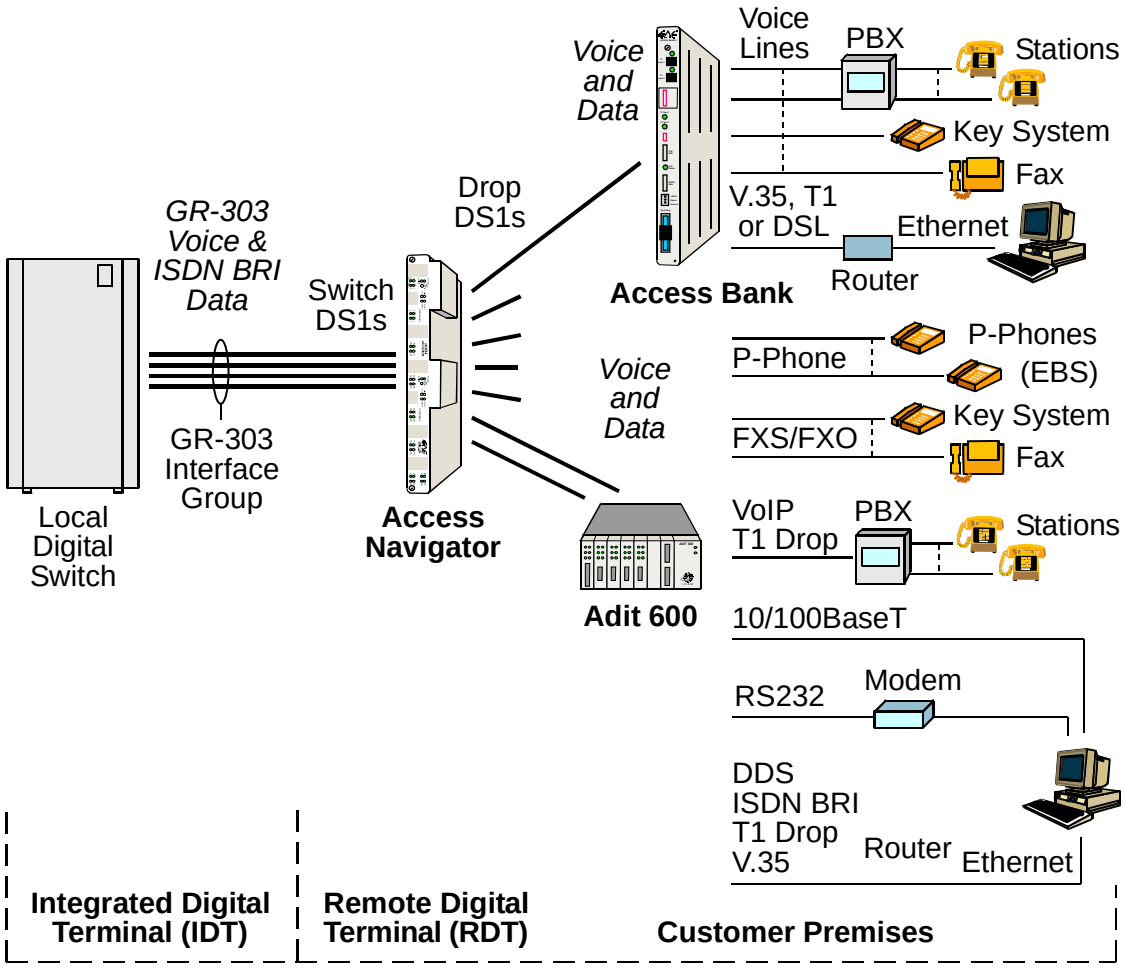

Figure A-1. GR-303 Architecture with the Access Navigator

In the GR-303 network architecture (see Figure 1), the local switch is called the Integrated Digital Terminal (IDT). The IDT connects to an intelligent Remote Digital Terminal (RDT), such as the Access Navigator. Between the IDT and RDT, management and voice traffic flow over an Interface Group (IG) comprising two or more T1s (DS1s). Dedicated DS0s in the IG carry the EOC and TMC. The remaining DS0s carry voice frequency calls assigned by the switch.

Services defined on the EOC interface allow remote management of GR-303 resources in the Access Navigator. GR-303 services are modeled by managed objects, which represent physical resources or support

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management functions. Attributes associated with an object describe its properties. Some attributes can be modified by services on the EOC interface, while others can only be read.

Services on the EOC consist of Actions, Commands, and Notifications.

- **Actions** are used to manage objects representing network elements and their functions. For example, you might *remove* or *restore* an Analog Line Termination. Tables in the following paragraphs show which actions the Access Navigator supports.
- **Commands** are used to manage the attributes or properties of each managed object. There are four basic commands: *create*, *get*, *set*, and *delete*. Not all commands are used with each object and attribute. Tables in the following paragraphs list the objects and attributes that can be managed in the Access Navigator.
- **Notifications** in the Access Navigator are limited to event reporting, such as sending an Event Report Notification message to indicate a service problem. Tables in the following paragraphs show which notification events the Access Navigator supports.

For detailed information, refer to the following Telcordia (Bellcore) documents.

- GR-303-CORE (TR-NWT-000303), *IDLC Generic Requirements, Objectives, and Interface*
- TR-TSY-000303, Supplement 3, *IDLC System Generic Requirements, Objectives, and Interface: Operations (ROS/CMIS/ASN.1) Messages, Release 1.0*

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Managed Object Class Support

The following tables list the managed object classes and attributes supported by the Access Navigator. The tables include all mandatory attributes of each object class. Conditional attributes appear if they are supported by the Access Navigator.

- Analog Line Termination Objects ... A-5
- *Alarm Count List Objects* on page A-5
- DS0 Channel Termination Objects ... A-6
- DS1 Framed Path Termination Objects ... A-6
- DS1 Line Termination Objects ... A-7
- EBS Line Termination Objects ... A-7
- ISDN Line Termination Objects ... A-8
- ISDN Framed Path Termination Objects ... A-8
- Quarter DS0 Channel Termination ... A-10
- Crossconnection ... A-10
- Equipment Objects ... A-11
- IDLC Call Processing Profile Objects ... A-11
- IDLC Data Link Profile Objects ... A-12
- IDLC Data Link Termination Objects ... A-13
- IDLC Terminal Objects ... A-14
- Memory Objects ... A-14
- Network Element Objects ... A-15
- Protection Group Objects ... A-15
- Protection Group Unit Objects ... A-16

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Analog Line Termination Objects

This object class is used to manage analog lines at the points where they originate or terminate. The Access Navigator inherently creates one instance of this object class for each GR-303 DS0 on a “drop” type DS1. The Create command can also be used to create an Analog Line Termination over the EOC.

Table A-1 Analog Line Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass	Yes	Yes		
analogLineTermId	Yes	Yes		Yes
primaryServiceState	Yes	Yes		
secondaryServiceState	Yes	Yes		
genSigFuncCode	Yes	Yes	Yes	
lineCircuitAddress	Yes	Yes		
alarmSeverityAssignmentList	Yes	Yes	Yes	
Optional Attributes				
callRefValue	Yes	Yes		
redlined	Yes	Yes		
currentProblemList	Yes	Yes		

Alarm Count List Objects

This object class contains a summary of the alarms that have not been cleared at the RDT. The Access Navigator inherently creates one instance of this object class if the switch type is DMS. The Create command may also be used to create an instance over the EOC.

The Create command will establish the GR-303 alarm count list at the physical location of the DS0 containing the Call Reference Value (CRV). CRVs can only be moved using CLI commands.

Table A-2 Alarm Count List Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass	Yes	Yes		
alarmCountListId	Yes	Yes		Yes
alarmCountInfo	Yes	Yes		

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DS0 Channel Termination Objects

This object class is used to manage DS0s in the Interface Group. The Access Navigator inherently creates an instance of this object class for each DS0 on a “switch” type DS1.

Table A-3 DS0 Channel Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
ds0ChannelTermId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		

DS1 Framed Path Termination Objects

This object class is used to manage DS1 framed paths. The Access Navigator inherently creates an instance of this object class for each “switch” type DS1.

The DS1 framed path termination identifier (ds1FramedPathTermId) matches the switch DS1 termination identifier (termid) set using CLI commands.

Table A-4 DS1 Framed Path Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
ds1FramedPathTermId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		
alarmSeverityAssignmentList		Yes	Yes	
ds1FrameFormat		Yes	Yes	

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DS1 Line Termination Objects

This object class is used to manage DS1 lines at the points where they originate or terminate. The Access Navigator inherently creates one instance of this object class for each "switch" type DS1.

Table A-5 DS1 Line Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
ds1LineTermId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		
ds1LineCode		Yes	Yes	
alarmSeverityAssignmentList		Yes	Yes	
lineCircuitAddress		Yes	Yes	
Optional Attributes				
currentProblemList		Yes		

EBS Line Termination Objects

This object class is used to manage EBS (P-Phone) lines at the points where they originate or terminate. The Access Navigator inherently creates one instance of this object class for each GR-303 DS0 with P-Phone enabled. The Create command can also be used to create an EBS Line Termination over the EOC.

Table A-6 DS1 Line Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass	Yes	Yes		
ebsLineTermId	Yes	Yes		
lcCutoffRelayStatus	Yes	Yes		
alarmSeverityAssignmentList	Yes	Yes	Yes	
callRefValue	Yes	Yes		
lineCircuitAddress	Yes	Yes		
redlined	Yes	Yes		

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ISDN Line Termination Objects

This object class is used to manage ISDN Basic Access lines. Instances of the ISDN Line Termination are part of the Network Element. Instances of the ISDN line Termination are created via switch provisioning or inherently when a crossconnect is created from the Command Line Interface.

Table A-7 ISDN Line Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
isdnLineTermId	Yes	Yes		
primaryServiceState	Yes	Yes		
secondaryServiceState	Yes	Yes		
alarmSeverityAssignmentList	Yes	Yes		
lineCircuitAddress	Yes	Yes		
Optional Attributes				
callRefValue	Yes	Yes		
currentProblemList	Yes	Yes		

ISDN Framed Path Termination Objects

This object class is used to manage 4:1 TDM ISDN Basic Access lines. Instances of the ISDN Framed Path Termination are part of the ISDN Line Termination. Instances of the ISDN Framed Path Termination are created via switch provisioning or inherently when a crossconnect is created from the Command Line Interface.

Table A-8 ISDN Framed Path Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
isdnFramedPathTermId	Yes	Yes	Yes	
primaryServiceState	Yes	Yes	Yes	
alarmSeverityAssignmentList	Yes	Yes	Yes	
ltOHStates	Yes	Yes	Yes	
ntOHStates	Yes	Yes	Yes	
Optional Attributes				
currentProblemList	Yes	Yes		
channelSelection	Yes	Yes	Yes	

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Table A-8 ISDN Framed Path Termination Objects (Continued)

cvHrCurrent	Yes	Yes		
cvFeHrCurrent	Yes	Yes		
cvHrPrevious	Yes	Yes		
cvFeHrPrevious	Yes	Yes		
esHrThreshold	Yes	Yes	Yes	
esHrCurrent	Yes	Yes		
esFeHrCurrent	Yes	Yes		
esHrPrevious	Yes	Yes		
esFeHrPrevious	Yes	Yes		
esHrHistory	Yes	Yes		
esFeHrHistory	Yes	Yes		
esDayThreshold	Yes	Yes	Yes	
esDayCurrent	Yes	Yes		
esFeDayCurrent	Yes	Yes		
esFeDayCurrent	Yes	Yes		
esFeDayPrevious	Yes	Yes		
sesHrThreshold	Yes	Yes	Yes	
sesHrCurrent	Yes	Yes		
sesFeHrCurrent	Yes	Yes		
sesHrPrevious	Yes	Yes		
sesFeHrPrevious	Yes	Yes		
sesDayThreshold	Yes	Yes	Yes	
sesDayCurrent	Yes	Yes		
sesFeDayCurrent	Yes	Yes		
sesDayPrevious	Yes	Yes		
sesFeDayPrevious	Yes	Yes		

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Quarter DS0 Channel Termination

This object class is created as part of the provisioning process for an ISDN Basic Access line. Instances of the Quarter DS0 Channel Termination are part of the ISDN Framed Path Termination. Instances of the Quarter DS0 Channel Termination are created via switch provisioning or inherently when a crossconnect is created from the Command Line Interface.

Table A-9 ISDN Framed Path Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
quarterDs0ChannelTermId	Yes			
primaryServiceState	Yes			
secondaryServiceState	Yes			

Crossconnection

This object class is created to establish a connection for the D-Channels associated with ISDN Basic Access lines. Instances of the Crossconnection are part of the Network Element. Instances of the Crossconnection are created via switch provisioning or from the Command Line interface.

Table A-10 Crossconnection

Attribute Support	Command Support			
	Create	Get	Set	Delete
crossConnectionId	Yes	Yes		
primaryServiceState	Yes	Yes		
secondaryServiceState	Yes	Yes		
fromTerminationId	Yes	Yes		
toTerminationId	Yes	Yes		
connectionType	Yes	Yes		
objectClass	Yes			
Optional Attributes				
redLined	Yes			

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Equipment Objects

This object class represents equipment within the network element. The Access Navigator inherently creates one instance of this object class.

Table A-11 Equipment Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
equipmentId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		
alarmSeverityAssignmentList		Yes		
Optional Attributes				
currentProblemList		Yes		

IDLC Call Processing Profile Objects

This object class represents the profiles of the call processing channel TMC connections. The Access Navigator inherently creates one instance of this object class.

Table A-12 IDLC Call Processing Profile Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
idlcCPProfileId		Yes		
t308		Yes	Yes	
Optional Attributes				
t303		Yes	Yes	
t396		Yes	Yes	
t397		Yes	Yes	

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IDLC Data Link Profile Objects

This object class represents the profiles of the Layer 2, LAPD data link connections. The Access Navigator inherently creates two instances of this object class, one for the EOC and one for the TMC.

Table A-13 IDLC Data Link Profile Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
idlcDLProfileId		Yes		
sapi		Yes		
maxIFrames		Yes	Yes	
n200		Yes	Yes	
t200		Yes	Yes	
t203		Yes	Yes	

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IDLC Data Link Termination Objects

This object class delimits the IDLC data link paths. The Access Navigator inherently creates four instances of this object class to represent the EOC primary, EOC secondary, TMC primary, and TMC secondary channels.

Table A-14 IDLC Data Link Termination Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
iIdlcDLTermId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		
dataLinkType		Yes		
carrierChannel		Yes		
protectionGroupPointer		Yes		
invalidFramesCounter		Yes		
invalidFramesThreshold		Yes		
invalidFramesTimer		Yes		
dlResetReqCounter		Yes		
dlResetReqThreshold		Yes		
dlResetReqTimer		Yes		
dlResetFailCounter		Yes		
dlResetFailThreshold		Yes		
dlResetFailTimerer		Yes		

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IDLC Terminal Objects

This object class represents the logical terminal of the Integrated Digital Loop Carrier system, in this case the RTD (Access Navigator). The Access Navigator inherently creates one instance of this object class.

Table A-15 IDLC Terminal Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass	Yes	Yes		
terminalId		Yes		
signalingMethod		Yes		

Memory Objects

Memory objects include represent binary information storage such as data tables and program software. The Access Navigator inherently creates one instance of this object class.

Table A-16 Memory Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
memoryId		Yes		
primaryServiceState		Yes		
secondaryServiceState		Yes		
memoryType		Yes		
alarmSeverityAssignmentList		Yes	Yes	
Optional Attributes				
currentProblemList		Yes		

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Network Element Objects

This object class represents telecommunications equipment that perform network element functions. The Access Navigator inherently creates one instance of this object class.

Table A-17 Network Element Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
networkElementId		Yes	Yes	
primaryServiceState		Yes		
secondaryServiceState		Yes		
systemTitle		Yes		
alarmSeverityAssignmentList		Yes	Yes	
Optional Attributes				
systemClock		Yes	Yes	
systemAlarmState		Yes		

Protection Group Objects

This object class represents protection groups. The Access Navigator inherently creates two instances of this object class, one for each protected LAPD data link (EOC and TMC).

Table A-18 Protection Group Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
protectionGroupId		Yes		
protectionType		Yes		
revertive		Yes		
numberOfProtecting		Yes		
numberOfProtected		Yes		
activateLockout		Yes		

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Protection Group Unit Objects

This object class represents working or backup units with a protection group. The Access Navigator inherently creates four instances of this object class to represent the EOC primary, EOC secondary, TMC primary, and TMC secondary channels.

Table A-19 Protection Group Unit Objects

Attribute Support	Command Support			
	Create	Get	Set	Delete
objectClass		Yes		
protectionGroupUnitId		Yes		
protectionObjectPointer		Yes		
protectionGroupUnitType		Yes		
inhibitSwitch		Yes		
Optional Attributes				
switchedProtectionGroup		Yes		

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Actions

The Access Navigator supports actions for the following managed objects. Blank cells in the table indicate there is no action support.

Table A-20 Action Support

Managed Object Class	Action Support
Analog Line Termination	remove restore
Alarm Count List	
DS0 Channel Termination	
DS1 Framed Path Termination	
DS1 Line Termination	operateLoopback releaseLoopback
EBS Line Termination	remove restore operateEbsRitLoopBackTR303
Equipment	
IDLC Data Link Profile	
IDLC Data Link Termination	
IDLC Call Processing Profile	
IDLC Terminal	
ISDN Framed Path Termination	Remove Restore Operate ISDN Loopback Remove ISDN Loopback Generate Corrupt CRC Initialize PM Attributes
Memory	
Network Element	
Protection Group	protectionSwitch
Protection Group Unit	

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Notifications

The Access Navigator provides event report notifications (alarms) for the following managed objects. (Alarm messages are described in *Clear Alarms – EOC* on page 14-8.)

Table A-21 Event Report Notification

Managed Object Class	Event Report Notification
Analog Line Termination	serviceProblemType
Alarm Count List	serviceProblemType
DS0 Channel Termination	
DS1 Line Termination	serviceProblemType transmissionProblemType
Equipment	environmentalProblemType equipmentProblemType
IDLC Call Processing Profile	
IDLC Data Link Profile	
IDLC Data Link Termination	serviceProblemType
IDLC Terminal	
Memory	
Network Element	environmentalProblemType equipmentProblemType transmissionProblemType
Protection Group	
Protection Group Unit	

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APPENDIX B

FDL Interface

In this Chapter

- Overview ... B-2
- Remote Provisioning Requirements ... B-3
- Remote Provisioning Capabilities ... B-4

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Overview

The Facility Data Link (FDL) interface is a management channel in the T1 Extended Superframe Format (ESF) described in ANSI standard T1.403. The Access Navigator uses this 4Kbps channel to communicate with the Adit 600 TDM and Access Bank II families of T1 voice and data access products.

Carrier Access provides provisioning and monitoring of remote Adit 600 and Access Bank II terminals using a Carrier Access FDL (CA FDL) protocol to send commands over the FDL channel.

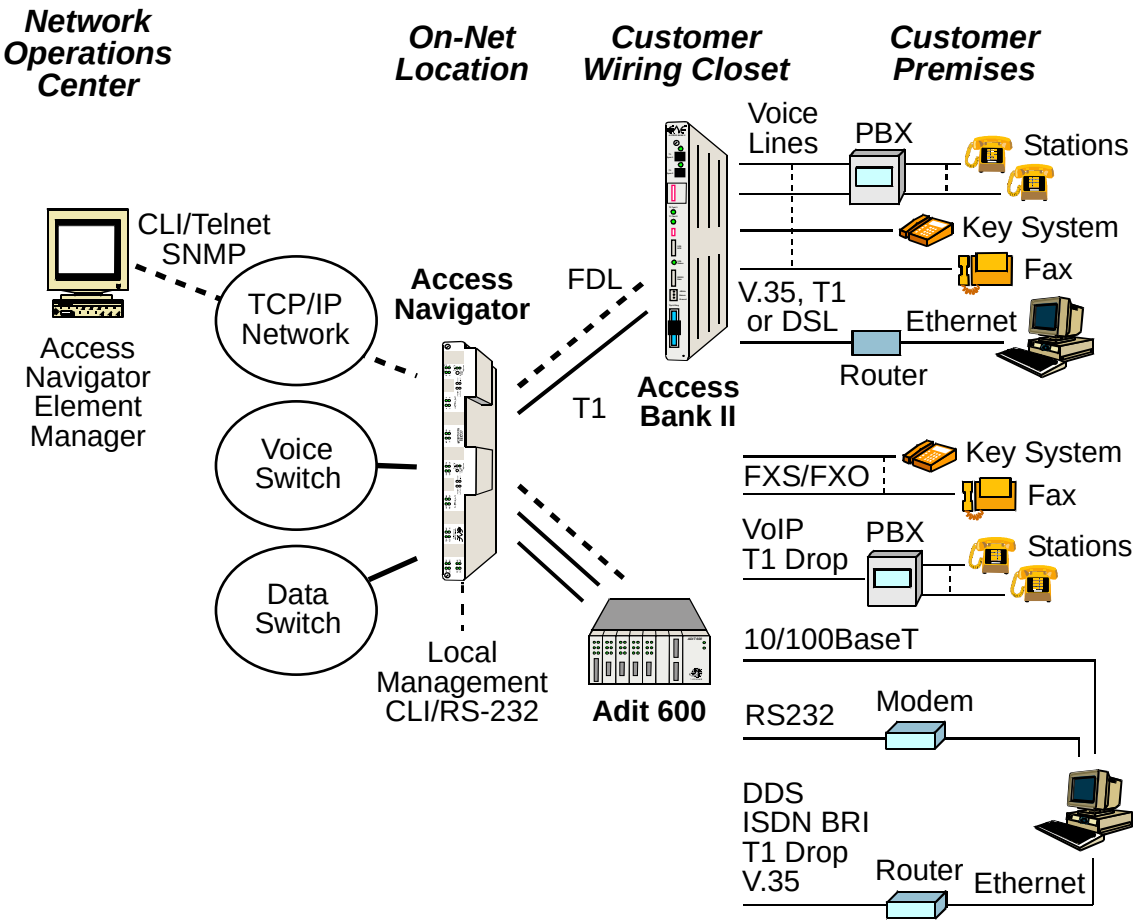

Figure B-1. FDL Interface

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Remote Provisioning Requirements

Remote provisioning, management, and testing of a Carrier Access remote terminal requires the following software versions and interconnecting DS1 or T1 link settings.

Access Navigator Remote Provisioning Requirements

- Software version: 1.20 or higher
- DS1 type: Drop
- DS1 framing: ESF
- DS1 FDL protocol: CAC

The Access Navigator communicates over the FDL using a Carrier Access FDL protocol that is compatible with the AT&T 54016 standard supported by the Access Bank II.

Access Bank II Remote Provisioning Requirements

- Software version: 2.21 to 2.99
- T1 framing: ESF
- T1 FDL protocol: AT&T 54016

To support remote provisioning, the Access Bank II family requires Controller card software version between 2.21 and 2.99. Software upgrades for versions 2.00 through 2.20 are available through the distributor or dealer from which you purchased the Access Bank II. Hardware and software upgrades are required for even older Controllers. To display the software version, connect the Access Bank II to your computer with Carrier Access Remote Monitor software, select the “Maintenance, DIP Switches” tab, and either click the “Read Current Screen from Access Bank 2” icon or click the “Read Current Screen from Unit” from the “Connection” dropdown menu.

Adit 600 TDM Remote Provisioning Requirements

- Software version: 1.4.1 or higher
- T1 framing: ESF
- T1 FDL protocol Not applicable

The Access Navigator can transport management commands to the Adit 600 over the FDL link. This feature enables the Network Operations Center to manage the Adit 600 using Telnet and IP connections to the Access Navigator.

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Remote Provisioning Capabilities

The Access Navigator works with a variety of CA Access Bank products. Currently, only the Access Bank II supports remote provisioning through the Access Navigator.

Access Bank II Capabilities

The Access Bank® II is remotely managed, provisioned, monitored, and tested through the Access Navigator over the ESF FDL management link.

The Access Bank II provides multiple voice and data services over one T1 connection. Standard interfaces include one or two analog voice cards providing up to 24 analog terminations (12 per card), an RS-232 asynchronous (subrate) port, a T1 Drop port for PBX or router, and a high-speed V.35 data port. The Access Bank II/SDSL comes with a high-speed SDSL port instead of the T1 Drop port.

Access Bank II Capabilities

Interface	Capabilities and Settings
T1 interface (T1 #1 or #2) to Access Navigator DS1 drop	Factory default T1 settings simplify installation and enable the Access Navigator to remotely provision the other interfaces Framing: ESF (default setting) Line code: B8ZS (default setting) FDL protocol: AT&T 54016 (default setting) Line build out: 0 to 666 ft., 0 to –22.5dB (0dB/0–133ft is the default setting) Loopback: payload
FX interface	Up to 24 FXO or FXS lines (12 per card) Default settings provide automatic loop start/ground start detection (per channel) Manual settings can also provide E&M and Wink start signaling (per card) Any DS0s on T1 #1 not used by other remote interfaces are automatically assigned to corresponding FXS lines.

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Access Bank II Capabilities (Continued)

Interface	Capabilities and Settings
RS-232 interface	Asynchronous RS-232 port for subrate data connection between two Access Bank II terminals Assignable to one DS0 Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600 Data bits: 7, 8 Start bits: 0 Stop bits: 1, 2 Parity: None, Even, Odd Receive clock: Internal, External Loopback: line
SDSL interface	High-speed data port for SDSL router Data rates up to 1.024 Mbps Assignable to a group of up to 16 DS0s SDSL port replaces T1 #2 port on Access Bank II/ SDSL
T1 Drop interface (T1 #1 or #2)	Drop and insert port for T1 PBX High-speed data port for T1 router Assignable to a group of one or more DS0s DS0s on T1 drop are assigned sequentially, starting with DS0 #1 Framing: D4 (SF), ESF Line code: AMI, B8ZS Line build out: 0 to 666 feet, 0 to –22.5 dB Loopback: line, payload
V.35 interface	High-speed data port for network router connection Assignable to a group of one or more DS0s Data speed (Kbps): Nx56 or Nx64, where N is the number of DS0s assigned CTS: Force High, Force Low, Follow CD, Follow RTS Rx timing: Internal, External Clock inversion: None, Rx, Tx, Rx and Tx Data inversion: None, Invert V.54 Data Service Unit (DSU) loopcode detection: on, off

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APPENDIX C

SNMP Interface

In this Chapter

- Overview ... C-2
- Carrier Access Enterprise MIB ... C-3
- SNMP Basics ... C-4
- SNMP Trap Reports ... C-9

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Overview

The Simple Network Management Protocol (SNMP) enables network operations centers (NOCs) to monitor and manage network elements across an internetwork. The Access Navigator supports SNMP through its Ethernet port (see Figure C-1), which provides access to the carrier's TCP/IP management network.

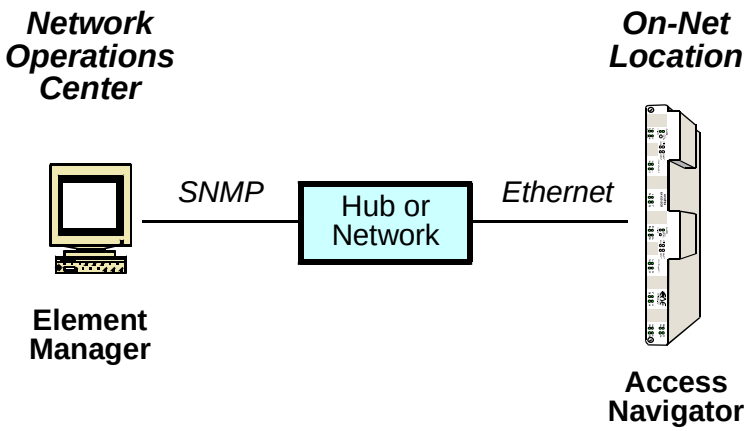

Figure C-1. SNMP via Ethernet TCP/IP

The Access Navigator SNMP Agent is based on the SNMPv1 standard. It implements the following two industry standard specifications for the TCP/IP and DS1 interfaces, plus an Enterprise MIB developed for managing CA's Access Bank II products:

- RFC 1213 – *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*
- RFC 1406 – *Definitions of Managed Objects for the DS1 and E1 Interface Types*

The Access Navigator supports all mandatory objects defined in RFC 1213 for the TCP/IP network interface.

The Access Navigator supports the DS1 mandatory objects in RFC 1406 Near End Configuration Group, including the Near End Current, Interval, and Total objects. The Far End Object Group is optional and is not currently supported.

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Carrier Access Enterprise MIB

The CA Enterprise MIB (Figure C-2) provides management support for Access Navigator features not included in the standard MIB (RFC 1213). It also enables remote management of CA products connected via the T1 facility data link (FDL) to the Access Navigator (Figure C-1). The CA Enterprise MIB supports:

- Access Navigator system configuration settings including SNMP
- Access Navigator interface management
- DS1 management features not supported by the standard MIB
- DS0 management
- Remote device management
- Remote crossconnect management
- Remote interface settings
- Remote DS1 settings
- Remote DS0 settings
- Remote cards and slots

NOTE: The Access Navigator documentation CD-ROM includes the Access Navigator Enterprise MIB definition file (ACCNAV.MIB) in ASN.1 standard syntax for use by network management software.

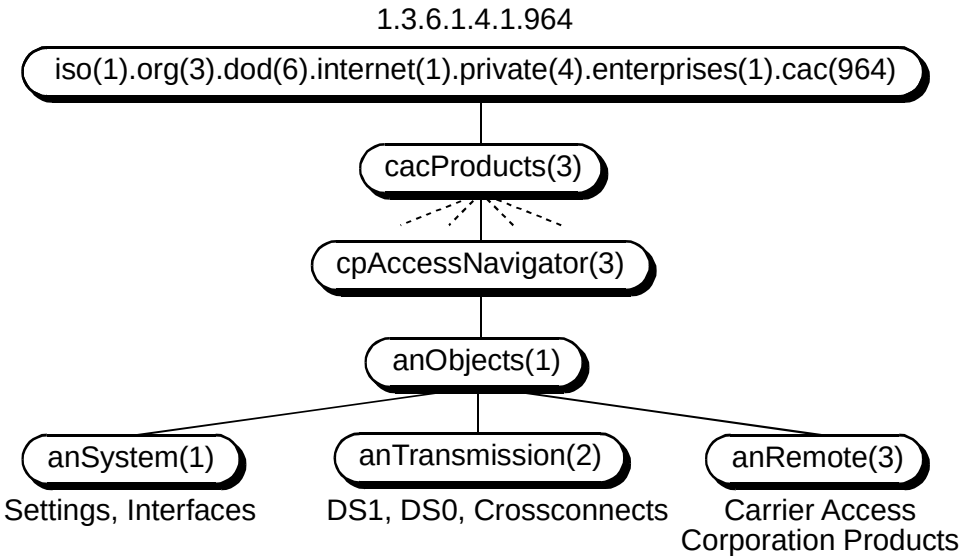

Figure C-2. Carrier Access Enterprise MIB (top level)

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SNMP Basics

- MIB Structure ... C-4
- MIB Tables ... C-5
- Managing Networks ... C-6
- SNMP Protocols ... C-7
- SNMP Requirements ... C-8

SNMP is a mechanism for managing TCP/IP networks. It works by exchanging information between an SNMP *Manager* and an SNMP *Agent*. In this case, the Agent is inside the Access Navigator. The Manager is a Network Management Station (NMS), which is a computer with SNMP management software such as HP OpenView® or SunConnect's SunNet Manager.

Carrier Access also offers NetworkValet™ EMS and Valet™, Java-based SNMP management programs for Windows and Solaris computers, that provide a graphical user interface to simplify management of the Access Navigator and other Carrier Access products.

NOTE: The Access Navigator documentation CD-ROM includes the Access Navigator Enterprise MIB definition file (ACCNAV.MIB) in ASN.1 standard syntax for use by network management software.

MIB Structure

The SNMP Agent displays network information in a Management Information Base (MIB). MIBs are machine-to-machine interfaces that arrange and present information according to industry standards such as RFC 1213. MIBs are tree-like structures comprising nodes and leaves. Nodes are branch points used to divide information into categories. Leaves have object values that can be examined and changed. Common MIB objects include system names, performance statistics, and control values. Table C-1 lists standard object types.

Control values are typically Integer types. This enables the object's value to represent a specific control selection. Selections are usually written in the "name(value)" format. For example, the selection "closed(1)" means that the "closed" state is indicated by a value of "1".

Each MIB object has both a text name and a numeric identifier. For example, the object name "sysUpTime" has the object identifier "1.3.6.1.2.1.1.3". Identifiers are written in dot-notation to show the path through the MIB structure. Object names are for humans. Only the object identifiers are used for communications between the manager and agent.

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MIB Tables

Related objects are normally grouped together to form a table. For example, the interface table ("ifTable" "1.3.6.1.2.1.2.2") contains information about each interface of the device. Objects in this table are accessed by adding a dot-number to the object name or identifier to select the desired interface. In this table the interface description object is "ifDesc" "1.3.6.1.2.1.2.2.1.2", so the description of the tenth interface is contained in "ifDescr.10" "1.3.6.1.2.1.2.2.1.2.10".

Table C-1.Standard SNMP Object Types

Object Type	Description
DisplayString	A printable text string, typically containing from 0 to 255 characters (0..255).
Counter	A numeric value that can only increase. The value is always positive and rolls over to zero after reaching maximum count.
Gauge	A numeric value that can increase or decrease.
Integer	A numeric value that can be positive or negative. Integers are often used to specify selections presented in the name(value) format.
TimeTicks	Elapsed time in hundredths of a second. Management software usually converts TimeTicks into hours, minutes, and seconds.
Object	An identifier for another object.
IpAddress	The IP address of a network device.
NetworkAddress	The network address of a device, such as an IpAddress. Format is typically hexadecimal or IP.
PhysAddress	The physical or Media Access Control (MAC) link layer address.

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Managing Networks

The SNMP standard MIB is used to manage basic network objects. In addition, SNMP is flexible enough that it can support a wide variety of MIBs describing other device functions and interfaces. For example, the Access Navigator uses the standard MIB (RFC 1406) for managing DS1 interfaces. Extended functions are provided by the CA Enterprise MIB. The complete MIB for CA's Access Navigator is in the ACCNAV.MIB file included on the CD-ROM containing this manual.

Objects are managed using "messages." SNMP Manager operations include simple "get" and "set" messages to read and write MIB data in the Agent. The Manager can get (read) all values, but not all values can be set (changed). Table C-2 lists standard Manager messages.

NetworkValet™ EMS and Valet™ software provide a graphical user interface to manage the Access Navigator MIB using simple menus, boxes, and buttons that the software translates into the appropriate SNMP messages.

Normally, the Manager polls the Agent periodically to check traffic statistics and system status. The Manager can also set object values that control device operation, such as resetting registers and enabling interfaces. The SNMP Agent can also send "trap" messages to the Manager. Trap messages are used to report when certain network events happen, such as a DS1 linkdown. When a trap event occurs, the Agent automatically sends an SNMP trap message back to the Manager, without waiting to be polled. (See *SNMP Trap Reports* on page C-9.)

Table C-2 Standard SNMP Messages

Message Type	Description
"get" Request	Returns the value of a named object. Used to fetch performance and statistics information and device settings.
"get-next" Request	Returns the name and value of the "next" object. Allows manager to determine all the names and values that a device supports.
"set" Request	Sets the named object to a specific value.
"trap" Message	Sends a trap message to the manager. Used to notify one or more network devices that a problem occurred.

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SNMP Protocols

The Manager and Agent are software applications. They communicate with each other through several protocol layers that are normally transparent to the user (Figure C-3). The Access Navigator uses Ethernet as the physical link between the Manager and Agent. Ethernet can, in turn, be transport any TCP/IP data.

SNMP is an application-level protocol intended to work with the User Datagram Protocol (UDP) and Internet Protocol (IP) suite, which includes BootP, Internet Control Message Protocol (ICMP), Address Resolution Protocol (ARP), and Reverse ARP (RARP). The advantage of UDP is that each message is independent (connectionless), so no network connections are continuously maintained between the Manager and Agent.

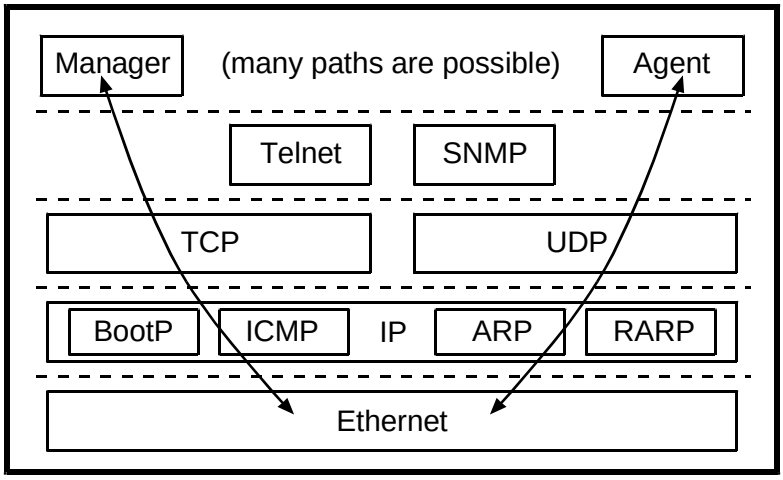

Figure C-3. SNMP Protocol Hierarchy Used in the Access Navigator

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SNMP Requirements

CLI commands must be used to configure the Access Navigator for SNMP operation. In particular, the operator must set up the Ethernet port, SNMP community strings, and NMS IP addresses. (See *CLI Language Reference* on page 18-1.) SNMP configuration includes the following items.

NOTE: To provide secure access, community strings are required for SNMP management, but can not be changed or displayed using SNMP set and get commands. Access attempts using invalid community names will be trapped and reported to the NMS.

Table C-3 SNMP Configuration Items

Commands	Descriptions
`set ethernet ip address`	Ethernet IP address and mask
`set ip gateway`	Gateway IP address
`set snmp contact`	System contact *
`set snmp location`	System location *
`set snmp getcom`	Get community
`set snmp setcom`	Set community
`set snmp trapcom`	Trap community
`set snmp nms`	NMS IP address (up to 3) †

* Contact and location can be changed through objects in the standard SNMP System Group.

† NMS IP addresses can be changed through objects in the Carrier Access Enterprise MIB.

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SNMP Trap Reports

The Access Navigator can send the following SNMP trap reports to up to three Network Management Systems (NMSs). NMS IP addresses can be set by CLI commands and through the SNMP interface. The trap-community strings can only be set using CLI commands (see *SNMP Configuration Items* on page C-8).

Table C-4 Standard SNMP Trap Reports

Trap	Description	Test Method
authenticationFailure	Occurs when a bad community string is used.	Attempt a Get or Set using an invalid community string.
linkDown	Sent when a DS1 changes from an up (in service) state to a down (out of service) state. It is not sent when a DS1 is set "down" by a manual command. Also sent when a DS1 is set up manually, if it is in an out-of-service state.	Disconnect an in-service DS1.
linkUp	Sent when a DS1 changes from a down (out of service) state to an up (in service) state. It is not sent when a DS1 is set "up" by a manual command.	Connect a DS1 and put it into service.
coldStart	Sent whenever the SNMP agent is restarted as a result of a software reset or unit power-up.	Cycle the power off and on.

Table C-5 Enterprise SNMP Trap Reports

Trap	Description	Test Method
anSwitchControllerTrap	Sent when switching redundant Controller cards.	Issue the "switch controller" command.
anRemoteLinkUpTrap	Sent when a remote link-up is detected. The trap message will include the AB2 Index and ID.	Connect an Access Bank II.
anRemoteLinkDownTrap	Sent when a remote link down is detected. The trap message will include the AB2 Index and ID.	Disconnect an Access Bank II.
anRemoteAlarmTrap	Sent when an alarm condition is detected or has cleared on a device attached to a drop DS1.	Cause alarms on connected and in-service Access Bank or Adit. Example: Disconnect a DS1 on an Adit that is not carrying the FDL.

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GLOSSARY

Abbreviations/Acronyms

ABI	Access Bank I
ABII	Access Bank II
ADSL	Asymmetrical Digital Subscriber Line
AIS	Alarm Indication Signal
AMI	Alternate Mark Inversion
B8ZS	Bipolar with 8-Zero Substitution
BER	Bit Error Rate
Bit	One binary digit; a pulse of data.
BPV	Bipolar Violation
bps	Bits Per Second
BRI	Basic Rate Interface
CEPT	Conference de administrations Europeenes des Postes et Telecommunications (European Conference of Postal and Telecommunications Administrations)
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check
CRV	Call Reference Value
CSU	Channel Service Unit
CV	Coding Violation
D4	D4 Framing

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DCE	Data Communications Equipment
DCS	Digital Crossconnect System
DDL	Digital Data Link
DID	Direct Inward Dial
DLC	Digital Loop Carrier
DS0	Digital Signal level 0
DS1	Digital Signal level 1
DSX-1	Digital Signal Crossconnect level 1
DTE	Data Terminal Equipment
E1	European digital signal level 1
EOC	Embedded Operations Channel
EBS	Electronic Business Set (or Service)
ESF	Extended Superframe
FAC	Facility
FDL	Facility Data Link
FX	Foreign Exchange
FXO	Foreign Exchange Office
FXS	Foreign Exchange Station
IP	Internet Protocol
ISDN	Integrated Services Digital Network
Kbps	Kilobits per second; one thousand bits per second.
LAN	Local Area Network
LBO	Line Build Out
LTE	Line Terminating Equipment

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LULT	Line Unit Line Termination
LUNT	Line Unit Network Termination
Mbps	Megabits per second; one million bits per second.
MIB	Management Information Base
MUX	Multiplex or Multiplexer
NE	Network Element
POP	Point of Presence
RAI	Remote Alarm Indication
S4	S4 framing
SDSL	Symmetrical Digital Subscriber Line
SF	Superframe
SLC-96	Subscriber Loop Carrier with 96 lines; also, SLC-96 framing
SNMP	Simple Network Management Protocol
T1	Trunk level 1
TCP	Transmission Control Protocol
TermID	Line Termination Identifier
TDM	Time Division Multiplex
WAN	Wide Area Network

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Definitions

3DS0 Mode

An ISDN BRI termination method that connects three DS0s to an ISDN BRI port, one for each B and D channel. This mode is very simple but not as efficient as the 4:1 mode. It works with non-GR-303 switch interfaces, using fixed connections for the B and D channels.

4:1 TDM Mode

An ISDN BRI termination method that connects 2.25 DS0s to an ISDN BRI port, one for each B channel and 0.25 for the D channel by multiplexing four D channels onto one DS0. This mode can efficiently carry 4 BRI ports using only 9 DS0s. It works with GR-303 switch interfaces, using a fixed connection for the D channel and dynamically connecting the two B channels when needed.

10Base-T

The IEEE 802.3 standard for operating Ethernet local area networks (LANs) at 10 Mbps data rates. 10Base-T uses twisted-pair cabling (such as conventional phone wires) to connect network elements to a wiring hub or router.

Alarm Indication Signal

AIS. Also known as a “Blue Alarm Signal” or “All Ones Keep Alive,” an AIS is an unframed all ones bit pattern sent by equipment at the far end to indicate that an alarm condition exists upstream in a circuit leading to the downstream equipment. Keep-alive signals are required by the network facilities to prevent oscillation of the line repeaters which causes interference (cross-talk and bleeding) within adjacent channels.

Alternate Mark Inversion

AMI. A line-encoding format used in bipolar DS1 (T1) transmission systems whereby successive ones (marks) are alternately inverted in polarity. This is the traditional method of line encoding used with voice signals. B8ZS coding is preferred for data signals because AMI does not preclude long strings of zeros from entering the public network from the DTE in violation of the pulse density requirements mandated in Part 68 of the FCC Rules and AT&T Publication 62411.

Asymmetrical Digital Subscriber Line

ADSL. See description of Symmetrical Digital Subscriber Line (SDSL)

Attenuation

Reduction of signal magnitude or increased signal loss, usually expressed in decibels (dB).

Basic Rate Interface

BRI. See Integrated Services Digital Network Basic Rate Interface.

Bellcore

Bell Communications Research. See Telcordia.

Bipolar with 8-Zero Substitution

B8ZS. A line-encoding format used to avoid long strings of zeros in a bipolar DS1 (T1) signals entering the network from the DTE. Every string of eight zeros is replaced by a special code (token). The code contains a pattern of bipolar

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	violations that is identified by the recipient and then removed in the decoding process to recreate the original string of zeros.
Bandwidth	Information-carrying capacity of a communication channel. Analog bandwidth is the range of signal frequencies that can be transmitted by a communication channel or network. Digital bandwidth is the transmission capacity or data rate expressed in bits or bytes per second.
Baud	Bits audio. An early telecommunications term referring to the communications rate, measured in bits per second, at which data can be transmitted through a modem or serial data line. Most equipment provide a selection of fixed baud rates, such as 9600 bps.
Bellcore	Bell Communications Research. See Telcordia.
Bipolar Violation	BPV. A violation of the bipolar transmission pattern, indicating a transmission error. For example, in AMI coding a BPV occurs when succeeding “ones” (pluses) are sent at opposite polarities. B8ZS patterns contain intentional bipolar violations for substitution codes, which are not counted as errors.
Bit Error Rate	BER. The number of coding violations detected in a unit of time, usually one second. BER is the ratio of errored bits received to the total bits transmitted.
Bits Per Second	bps. The transmission rate for digital information.
Blocked Call	A call that cannot be connected because a line is not available.
Basic Rate Interface	See Integrated Services Digital Network Basic Rate Interface.
Call Reference Value	CRV. A number used by central office switches to uniquely identify a DS0 or subscriber line. In the Access Navigator, the GR-303 switch uses the CRV to set up crossconnects in the Access Navigator between switch DS0s and drop DS0s.
Channel	The smallest subdivision of a circuit that provides a type of communication service, usually a one-directional connection between two points. A DS0 is often treated as a channel because it includes both transmission and receive paths.
Channel Bank	A CSU with service cards that provide individual analog lines to subscriber phones.
Channel Service Unit	CSU. A device used to connect a DS1 (T1) digital phone line from the central office to a PBX or computer system. A CSU performs line-conditioning and equalization functions, and responds to loopback commands from the central office.
Circuit	A communications path or network, usually a pair of channels providing bi-directional communication.

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Circuit Identifier	A character string assigned by the circuit vendor, which is useful when communicating with the vendor during the troubleshooting process.
Circuit Switching	Basic switching process whereby a circuit between two users is opened on demand and maintained for their exclusive use for the duration of the transmission.
Coding Violation	CV. A transmission error detected by the difference between the transmitted and the locally calculated bit-interleaved parity.
Community Name	String that defines an administrative relationship between SNMP entities.
Crossconnect	A non-permanent, two-way signal connection using wire or fiber used to join two circuits together or to complete a signal path between a source and destination. A simple crossconnect might use copper wires on a punchdown block to complete a circuit between an incoming telephone line connected to one set of terminals and a desk phone connected to a second set of terminals. Patch cords and cables can also be used to make connections. Connections can also be made electronically using a Digital Crossconnect System.
CSU Attenuation	Adjusting output amplitude to meet the receiver requirements of the Channel Service Unit. CSUs are designed for long-distance operation and usually require additional signal attenuation when closer to the transmitter. Attenuation is measured in decibels (dB) and is usually selectable in fixed steps between 0 dB and -22.5 dB.
Customer Premises Equipment	CPE. Items of telecommunications equipment, such as key systems, PBXs, answering machines, and CSU/DSUs, which reside on the customer's premises past the carrier's network interface.
Cyclic Redundancy Check	CRC. A technique for detecting transmission errors. A CRC indicator based on the remainder of a polynomial calculation is performed on the transmitted data and inserted into the frame overhead. Another CRC is calculated for the received data and compared to the embedded CRC to check for transmission errors.
D4	D4 framing gets its name from AT&T corporation's D4-series channel banks. D4 is used for T1 transmissions and contains 12 separate 193-bit frames combined to make a Super Frame (SF). Each frame contains one framing bit followed by the data for 24 channels (8 bits each). D4 also uses the framing bit to identify the channel bank and to synchronize the receiver to decode the robbed-bit signaling data carried by the least-significant bit of each DS0 channel.
Data Communi-cations Equipment	DCE. In the EIA/TIA 232E standard specification, the RS-232 interface is connected between Data Communications Equipment (DCE) and Data Terminal Equipment (DTE). The main difference between the DCE and the DTE is that pins two and three are reversed on the cable connector.

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Data Terminal Equipment

DTE. See description at Data Communications Equipment (DCE).

Digital Data Link

DDL. An out-of-band communications link used in SLC-96/TR-08 digital loop carrier systems for traffic maintenance and call setup.

Defect

A limited interruption in the ability of an item to perform a required function.

Demultiplexing

A process applied to a multiplex signal for recovering signals combined within it and for restoring the distinct individual channels of the signals.

Digital Crossconnect System

DCS. An electronic crossconnection that has access to lower-rate channels in higher-rate multiplexed signals and can electronically rearrange (crossconnect) those channels. The Access Navigator provides DCS 1:0 level switching, which means that it can crossconnect both DS1 and DS0 signals. The DCS switching configuration must typically be set up in advance and remain in place until changed by an operator.

Digital Loop Carrier

DLC. Digital Loop Carriers are specialized SONET back-to-back multiplexing systems providing circuit concentration in the local loop market. The elements used are similar to the Terminal Mux but transmission speed is normally limited to 155 Mbit/s (OC-3).

Digital Signal

An electrical or optical signal that varies in discrete steps. Electrical signals are coded as voltages, optical signals are coded as pulses of light.

Direct Inward Dial

DID. The ability for a caller outside a company to call an internal extension without assistance or additional steps. The dialed digits are passed from the central office to the subscriber's PBX, which then connects the call to the proper extension.

Digital Signal level 0

DS0. The basic digital signal at 64,000 bits per second (bps) used to transport 8,000 data bytes or voice samples per second over telecommunications networks.

Digital Signal level 1

DS1. A digital signal at 1.544 million bits per second (Mbps) in North America where it is used with T1 facilities, and at 2.048 Mbps elsewhere where it is called E1. The equivalent of 24 DS0 signals in North America and 30 DS0 signals elsewhere.

Digital Signal Crossconnect level 1

DSX-1. Refers to equipment that crossconnects DS1 rate signals, typically over short distances up to 660 feet.

DSX-1 Equalization

Shaping of the transmit signal wave form to meet the requirements of Digital Signal Crossconnect, level 1 transmissions between central office equipment. The amount of equalization depends on the length of interconnecting cable and is usually selectable in fixed ranges, measured in feet.

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E1

European CEPT digital signal level 1, similar to the North American DS1 except that the E1 information rate is 2.048 Mbps and transports 30 DS0 signals, compared to the 24 DS0 signals in the North American DS1. E1 also employs a separate signaling channel instead of using robbed-bit signaling, so all 8 bits of the DS0 are used to code the wave shape of the digitized voice sample.

Electronic Business Set (or Service)

See P-Phone.

Embedded Operations Channel

EOC. The GR-303 switch system communicates with the Access Navigator using an EOC and Timeslot Management Channel (TMC) in the GR-303 Interface Group (IG). The EOC carries management data (provisioning, messages, and alarms), while the TMC carries call setup data. The switch sets up crossconnects in the Access Navigator between switch DS0s and drop DS0s. Each drop DS0 is identified by a unique Call Reference Value (CRV).

Extended Superframe

ESF. A North American format for DS1 rate signals at 1.544 Mbps that extends the capability of the Superframe (or D4) format to include a 4 Kbps facility data link channel by using some of the 8 Kbps overhead used for synchronization.

Facility Data Link

FDL. An out-of-band communications link used for traffic maintenance. The DS1 Extended Superframe (ESF) format provides an FDL channel with 4 Kbps data rate.

Failure

A termination of the ability of an item to perform a required function. A failure is caused by the persistence of a defect.

Filling

Consolidating traffic into one line, such as a DS1, for more efficient transport.

Foreign Exchange

FX. A telephone service providing local access to a central office that is outside of (foreign to) the subscriber's local exchange area. A Foreign Exchange Office (FXO) provides dial tone to a Foreign Exchange Station (FXS).

Fractional Interface

A service interface using only a portion of the available capacity. In the Access Navigator, this term refers to a DS1 or T1 connection using fewer than 24 DS0s. The fractional interface is a group of sequential DS0s in the same DS1, such as DS0s 19 through 24.

Framing

An error control format used to multiplex digital data, such as DS0 channels, into larger frames, such as DS1 (T1) and DS3. Frames contain time slots for each channel’s data and include a framing bit to synchronize the receiver so it can de-multiplex the data and recover the individual channels. The most common framing for DS1 transport are D4, S4, and ESF.

Frequency

The number of cycles of periodic activity that occur in a discrete amount of time.

Gateway

Any device that passes packets from one network to another network in their trip across the Internet. A gateway usually has its own network IP address.

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GR-303

A Telcordia® (formerly Bellcore) generic requirement describing a digital loop carrier system that operates on T1 circuits between an Integrated Digital Terminal (switch) and a Remote Digital Terminal. The IDT controls the RDT through an Embedded Operations Channel (EOC) for messaging and an embedded Timeslot Management Channel (TMC) for setting up crossconnects. GR-303 systems can provide call concentration from 1:1 to 44:1 and are expandable from 2 to 28 T1 circuits that can carry up to 668 channels simultaneously.

Grooming

Consolidating or segregating traffic for efficiency.

Interface

A general term that refers to a system connection, port or boundary. Interfaces are described by their physical, electrical, and data properties. Access Navigator interfaces include the Alarm Output connector, DSX-1 interface, and Ethernet port.

Internet Protocol

IP. A network layer protocol. The dominant layer protocol used in TCP/IP applications.

Internet Protocol Address

A 32-bit network address that uniquely locates a host in an internetwork. Most IP addresses today still use IP version 4 (IPv4) format containing four numbers separated by three periods. The general format is xxx.xxx.xxx.xxx where each xxx is a decimal number between 0 and 255.

Integrated Services Digital Network Basic Rate Interface

ISDN BRI provides 144,000 bits per second and is designed for desktop service. ISDN BRI is also referred to as 2B+D because it provides two Bearer channels (B1 and B2) at 64 kilobits per second, plus one D channel for signaling at 16 kilobits per second. The ISDN BRI card complies with the Universal Digital Loop Carrier (UDLC) model described in Telcordia® (Bellcore) specification TR-397.

Line Build Out

LBO. A DS1 (T1) transmit output property that ensures the signal received at the other end of the line has the required amplitude and shape to minimize errors. This property is specified either by its DSX-1 Equalization or CSU Attenuation.

Line Termination Identifier

TermID. An identifier used in GR-303 systems to number the switch DS1s. These IDs are independent of the hardware DS1 numbers. Any switch DS1 can be Line Terminal ID #1

Line Unit Line Termination

LULT. A line unit (card) for terminating a subscriber-side ISDN BRI port.

Line Unit Network Termination

LUNT. A line unit (card) terminating a network-side ISDN BRI port.

Line

Traditionally, an electrical path (two wires) between the central office and a subscriber phone. More generally, any connection between two points in a carrier network.

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Line Loopback	A connection that loops back the entire signal along with the original framing.
Line Overhead	The traffic management portion of a communications system that is transported in the overhead bits of communications links such as DS1, DS3, and SONET.
Line Terminating Equipment	LTE. Network elements such as add/drop multiplexers or digital crossconnect systems which can access, generate, and process Line Overhead.
Local Area Network	LAN. Usually refers to a network connecting users in physical proximity, such a one floor or one building.
Loopback	A temporary test connection in a communications network that loops the transmit signal line back towards the receive signal line in order to verify the signal path.
Management Information Base	MIB. A database used by Simple Network Management Protocol (SNMP) systems to check network statistics and configurations.
Multiplex	MUX. To transmit two or more signals over a single channel.
Multiplexer	MUX. A device for combining several channels to be carried by one line or fiber.
Narrowband	Services requiring up to 1.5 Mbps transport capacity.
Network Element	NE. Any device that is part of a communications network and can terminate section, line, or path overhead functions.
Orderwire	A channel used by installers to expedite the provisioning of lines.
Overhead	Extra bits in a digital stream used to carry information besides traffic signals. Orderwire, for example, would be considered overhead information.
P-Phone	Proprietary Phone, also called an Electronic Business Set (EBS), is an analog Centrex service offered by Nortel and supported by Nortel DMS switches and P-Phone compatible telephone stations. The analog signal between the P-Phone and Central Office is a single-pair subscriber loop providing normal full-duplex analog voice and an 8-kHz half-duplex amplitude-shift-keyed signal that carries signaling information. Nortel NIS V202-1 specifies the GR-303 requirements for a remote digital terminal (RDT) interface with the Nortel DMS switch.
Parity	An error-checking scheme which examines the number of transmitted bits in a block which hold the value one. For even parity, an overhead parity bit is set to either one or zero to make the total number of transmitted ONES an even number. For odd parity, the parity bit is set to make the total number of ONES transmitted an odd number.
Path	A logical connection between two points in a network, which may follow many physical paths.

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Payload — The portion of a framed signal that carries services, such as voice or data, to the subscriber.

Payload Loopback — A connection that loops back only the payload portion of a signal, usually by demultiplexing and extracting the payload data and then reframing it.

Permanent Call — A calling state resulting from a subscriber phone being left off-hook.

POP — Point-of-Presence. A point in the network where inter-exchange carrier facilities like DS3 or OC-N meet with access facilities managed by telephone companies or other service providers.

RAI — Remote Alarm Indication. A code sent upstream in a digital signal network as a notification that a failure condition has been declared downstream. (RAI signals were previously referred to as Yellow signals.)

Remote Interface — An interface provided by a remote Access Bank II. These include: FX analog voice lines and RS-232,SDSL, T1 Drop, andV.35 ports.

RS-232 — Also known as RS-232-C and EIA/TIA-232-E. A standard specifying the electrical, functional, and mechanical (connector) interface for short-distance (up to 50 feet) serial communication between computers, modems, and other peripheral equipment. The traditional DB25 connector has 25 pins, but the IBM PC popularized the smaller DB9 (or DE9) 9-pin connector.

S4 (or SLC-96) — S4 framing is named for AT&T corporation's SLC-96® Subscriber Loop Carrier system. This was a remote terminal system containing four shelves. S4 framing was used on the T1 between the central office switch and the first shelf (A), which served as the controller for the system. The S4 framing bit carried signaling information to set up calls through the terminal. The other three shelves used standard D4 framing

Simple Network Management Protocol — SNMP. A protocol that enables network operations centers (NOCs) to monitor and manage network elements across an internetwork. SNMP is a mechanism for managing TCP/IP networks. It works by exchanging information between an SNMP Manager and an SNMP Agent. In this case, the Agent resides in the Access Navigator. The Manager is a Network Management Station (NMS), which is a computer with SNMP management software. SNMP is described in standards RFC 1213 and RFC 1406.

SLC-96 — The AT&T SLC-96® Subscriber Loop Carrier system, which was one of the first digital loop carrier systems deployed for short-haul multiplexing in the United States. The SLC-96 terminal allows 24 analog telephone lines to be digitally multiplexed and carried over one T1 line. Up to four shelves (called A, B, C, and D) could be connected together to provide 96 telephone lines. The general specifications for the SLC-96 system was later incorporated into the Telcordia technical requirement TR-08.

SLC-96 Framing — SLC-96 and TR-08 terminals use two types of framing: SLC-96 DLL and SLC-96 S4 (or D4). For Shelf A, the DS1 FDL protocol is set to SLC96 to obtain SLC-96 DDL framing with its out-of-band data link management channel. For Shelf B, C, and D, the FDL is set to None to obtain standard SLC-96 S4 (or D4) framing.

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Stratum

Stratum or Stratum Level refers to the accuracy of the clock source used to synchronize SONET communications systems. Accuracy is important in maintaining communications across a network. During local network failures, a backup clock source is used to maintain network timing. But when the backup clock becomes temporarily isolated because of an equipment or line failure, the clock phase will drift slowly until the communications link eventually falls out of synchronization. Stratum 1 is the primary SONET clock source obtained from a Cesium beam time standard located in Paris, France. Stratum 2 is less accurate, but can keep a network synchronized for 3 to 5 days. Stratum 3 and Stratum 4 are each less accurate (and less expensive) and can provide backups for shorter time periods.

Symmetrical Digital Subscriber Line

SDSL. A service providing data transfer rates of up to 1 megabit per second in both directions (symmetrical). SDSL is preferred over Asymmetrical DSL (ADSL) for most business networking applications. A low-cost SDSL router can provide one or more Ethernet ports for simple connection to the subscriber's computers or local area network.

Superframe

SF. Any structure made of multiple lower-rate frames.

Telcordia

Previously known as Bellcore (Bell Communications Research), the company now known as Telcordia Technologies was created during the divestiture of the Bell System in 1984 to serve the Bell operating companies by providing a center for technological expertise and innovation.

Telnet

Telecommunications network protocol. A terminal emulation protocol that runs on top of TCP/IP. Telnet lets a user log into a remote host or server. A user name and password are normally required. Telnet provides a simple command line interface using text characters. Originally developed for ARPAnet, Telnet is defined in Internet STD 8 and RFC 854

TR-08

A Telcordia technical requirement for digital loop carrier systems based on the SLC-96 terminal. This interface transports 96 analog telephone lines over four T1 lines connecting the switch to the TR-08 terminal. Terminals can have up to four shelves (A, B, C, D) with each shelf terminating up to 24 analog voice lines. The switch manages the terminal through the out-of-band SLC-96 digital data link (DDL) channel on the T1 connection to Shelf A

Transmission Control Protocol

TCP. A transport layer protocol that offers connection-oriented, reliable stream service between two hosts. TCP is the primary transport protocol used by TCP/IP applications.

Trap

A monitoring function that triggers an alarm or sends a message when a certain event occurs or a threshold value is exceeded.

Trunk level 1

T1. A digital transmission link used in North America to transport data at 1.544 million bits per second. T1 is a facility or service normally delivered over two pairs of copper wires, one pair for transmit and one pair for receive. Fiber T1 (FT1) uses fiber optics instead of copper. T1 is based on the DS1 time division multiplexed (TDM) signal carrying 24 DS0 channels

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V.35 An international ITU-T standard for data transmission up to 1.544 Mbps (T1 line rate). It is typically used for trunk interface between high-speed digital carriers and packet network DTE or DCE equipment. Network routers are widely available with V.35 interfaces.

V.54 An international ITU-T standard for loop tests in modems, data communications equipment, and data terminal equipment, using transmitted bit pattern codes to cause the devices to loopup and loopdown on command.

Wide Area Network WAN. Generally refers to a network that connects users and systems across large distances using telecommunications networks such as phone lines or radio links.

Wideband Services requiring 1.5 to 50 Mb/s transport capacity.

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